IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

MYPORT TECHNOLOGIES, INC., Plaintiff, v. APPLE, INC. Defendant.	C.A. No. 1:24-cv-01337-JDW **DEMAND FOR JURY TRIAL**

AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff MyPort Technologies, Inc. ("MyPort" or "Plaintiff") brings this action for patent infringement under 35 U.S.C. § 1, *et seq*., against Defendant Apple, Inc. and alleges as follows:

THE PARTIES

1. Plaintiff MyPort is a Delaware corporation formed on November 18, 1999, with an address at 2711 Northview Drive, McKinney, Texas 75072. MyPort's founder and current CEO is Mr. Michael Malone.

2. Defendant Apple is a California corporation with its principal place of business at One Apple Park Way, Cupertino, CA 95014. Apple is a publicly traded company that may be served through its registered agent for service, CT Corporation Trust Company, 1209 Orange Street, Wilmington, Delaware 19801.

JURISDICTION AND VENUE

3. This is an action for patent infringement arising under the provisions of the Patent Laws of the United States of America, Title 35, U.S.C., § 1 *et seq*.

4. This Court has subject matter jurisdiction over MyPort's claims under 28 U.S.C. §§ 1331 and 1338(a).

5. This Court has both general and personal jurisdiction over Apple. Apple has committed acts within this District giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over Apple would not offend traditional notions of fair play and substantial justice.

6. Apple has conducted and continues to conduct business within this District. Apple, directly or through subsidiaries or intermediaries (including distributors, retailers, and others), ships, distributes, makes, uses, offers for sale, sells, imports, and/or advertises (including by providing interactive web pages) its products and/or services in the United States and in this District and/or contributes to and actively induces its customers and others to ship, distribute, make, use, offer for sale, sell, import, and/or advertise (including the provision of interactive web pages) infringing products and/or services in the United States and this District.

7. Apple, directly and through subsidiaries or intermediaries (including distributors, retailers, and others), has purposefully and voluntarily placed one or more of its infringing products and/or services, as described below, into the stream of commerce with the expectation that those products will be purchased and used by customers and/or consumers in this District. These infringing products and/or services have been and continue to be made, used, sold, offered for sale, purchased, and/or imported by customers and/or consumers in this District.

8. Venue in this District is proper under 28 U.S.C. §§ 1391 and 1400(b).

9. MyPort is an entity organized under the laws of Delaware and resides in Delaware for purposes of venue under 28 U.S.C. § 1400(b).

10. Apple has a regular and established place of business in this District. For example, Apple has employees and operates a retail store in this District at 125 Christiana Mall, Newark, DE 19702. *See* https://www.apple.com/retail/christianamall/ (last

accessed Oct. 9, 2025); https://www.christianamall.com/en/directory/apple-8718.html (last accessed Oct. 9, 2025). Apple's retail store at 125 Christiana Mall sells and offers for sale infringing products and/or services.

11. Venue is also proper based on the facts alleged in the foregoing paragraphs, which MyPort incorporates as if fully set forth herein.

THE PATENTS-IN-SUIT

12. United States Patent No. 9,832,017 ("the '017 Patent"), entitled "Apparatus for personal voice assistant, location services, multi-media capture, transmission, speech to text conversion, photo/video image/object recognition, creation of searchable metatag(s)/ contextual tag(s), storage and search retrieval" issued on November 28, 2017. A true and correct copy of the '017 Patent is attached as Exhibit A.

13. United States Patent No. 10,237,067 ("the '067 Patent"), entitled "Apparatus for voice assistant, location tagging, multi-media capture, transmission, speech to text conversion, photo/video image/object recognition, creation of searchable metatags/ contextual tags, storage and search retrieval" issued on March 19, 2019. A true and correct copy of the '067 Patent is attached as Exhibit B.

14. United States Patent No. 10,721,066 ("the '066 Patent"), entitled "Method for voice assistant, location tagging, multi-media capture, transmission, speech to text conversion, photo/video image/object recognition, creation of searchable metatags/contextual tags, storage and search retrieval" issued on July 21, 2020. A true and correct copy of the '066 Patent is attached as Exhibit C.

15. MyPort owns the '017 Patent, the '067 Patent and the '066 Patent (collectively, the "Patents-in-Suit").

16. Each of the Patents-in-Suit is valid and enforceable.

17. MyPort has the exclusive right to sue and collect remedies for past infringement of the Patents-in-Suit.

BACKGROUND

18. MyPort incorporates the allegations of the foregoing paragraphs as if fully restated herein.

19. The patented innovations described herein originate from work by Mr. Michael Malone, the sole named inventor of each of the Patents-in-Suit, during his nearly 50 years in the technology industry. In the early 1990s, he co-founded a company that engineered, manufactured and distributed fax over internet routers for fax machines, and was a pioneer in bridging the gap between faxes, which were limited to being sent over analog telephone lines, and digital internet communications such as email and texts. A few years later, he co-founded another company in the internet shopping and e-commerce space.

20. In or around 2000, Mr. Malone formed MyPort Technologies, Inc. to patent and protect his numerous inventions in the space of encryption, geotagging, and the use of speech recognition and image recognition to create metadata tags to allow digital photographs to be easily stored and searched.

21. At the time of the invention for the Patents-in-Suit, the ability for a digital media device, such as a smartphone, to store many media files presented problems, including making it difficult and time-consuming to manually describe and index every media file (such as a picture). There also existed the problem that when these media files were emailed or sent to another party, the receiving party could not search the media files for the specific key indexes that the owner had intended.

22. The patented inventions of the Patents-in-Suit solved these and other existing problems by, among other things, conceiving of the use of a microphone to capture audio information; a camera to capture image information; GPS to capture location and time information, and the use of data converters to process, convert, and store the audio and image information into a text based searchable file as a context tag, using speech recognition and image recognition, such as artificial intelligence and/or machine learning, for storage and search retrieval.

23. MyPort's patented innovations of the Patents-in-Suit have become essential to modern photo, and photo application development. MyPort's Patents-in-Suit have been cited as prior art against later patent applications from industry leaders on more than 100 occasions. These patents were recently asserted against and licensed by Samsung.

24. The Patents-in-Suit are directed to a patent-eligible, non-abstract idea and solved multiple problems in the prior art. In MyPort's prior litigation against Samsung, where MyPort asserted the same three Patents-in-Suit, the Samsung district court ruled that there were "outstanding fact issues under Step 2 of *Alice*" that precluded summary judgment of patent ineligibility for each of the Patents-in-Suit. *See* Ex. D at 2 (redacted copy incorporated herein). In the briefing that formed the basis for this Court Order, MyPort's expert submitted written testimony explaining that the patented invention claims a novel ordered combination of elements, including application of "image recognition" for media content "tag generation," "conversion" of audio "to a text context tag" and association of that resulting text context tag with a "stored digital image," the use of two specific data converters to perform those functions. *See generally* Ex. E at ¶¶ 617, 623, 627, 629-631 (incorporated herein).[1] That ordered combination of the claim

[1] Though Ex. E is marked "Restricted-Attorneys' Eyes Only" the portions cited in the exhibit attached herein do not contain any confidential information.

limitations present patent eligible subject matter that is not well-understood, routine, or conventional. *Id.*

25. Specifically, as discussed in the specification, at the time of the invention, users faced "problems" finding media content among vast numbers of files. '017 Patent at 2:30-35.[2] It was "nearly impossible" for users to organize those files "manually." *Id.*, at 2:31-35. And technology did not exist at the time that would make it possible to organize media files (unlike text files) automatically. *Id.*

26. Moreover, even if users added metadata to media files to facilitate organization, reliable methods for preserving that metadata during data transfers was non-existent. If users painstakingly added metadata to their photo or music collection to facilitate organization, that information would be lost if the user transferred the files to another device, or sent the media files to others—leaving large collections of photos and audio files effectively unsearchable. *See, e.g.*, '017 Patent at 2:49-59. Existing systems did not allow for a durable and persistent association of recognition-derived tags (such as speech-to-text or image context tags) with media files in a way that enabled later search and retrieval. *Id.* at 2:22-3:30.

27. The Patents-in-Suit solved those problems with a concrete, non-abstract invention that improves the functioning of the computer and network. Each Patent-in-Suit claims systems and methods that enhance the way computers capture, process, associate, transmit, store, and retrieve multimedia information. The asserted claims recite specific, structural components and ordered operations. Claim 6 of the '017 patent, for example, recites specific hardware components, a "microphone" that captures and stores audio and a "camera" that captures and stores images,

[2] The Patents-in-Suit share a common specification with the substantially same disclosure. Unless otherwise noted, patent citations made herein are only to the '017 Patent.

connected to respective "data converter[s]." '017 Patent at 11:10-32. The converters have specific functions: the first data converter processes and stores the audio and image data, while a "media data converter" processes the audio and image to generate a "text based searchable file as a text context tag" and an "image recognition searchable context tag" characterizing the content. *Id.* at 11:25-33. The claims also recite a "combiner" (data combiner and compressor) that creates a composite data set, a transmitter that transmits a temporally-defined "stored defined set" (the capture initiated at an initial time and completed at a completion time) to a remote node, and a remote system/receiver and system data converter that converts the received defined set into a searchable format and produces searchable text and image context tags which are associated with the image and stored in a database. *See, e.g., id.* at Abstract; 2:22-3:30; 3:50-4:44; 5:39-58; 8:61-9:23; 10:28-56.

28. The Patents-in-Suit explain how these recited structures and ordered steps solve concrete technological problems in the prior art. The specification teaches (i) combining multiple data sources (primary data set, secondary/context description element, and meta data) into a single composite data stream and compressing that stream so that the resulting "compressed data set" "requires fewer transmission or storage resources than the uncompressed stream, but remains recoverable such that the original data … can be recovered without error" (*id*. at 9:13-23); (ii) preserving searchable metadata through explicit techniques, including a file-format designator with a user identifier, sequence number/time stamp, and structured filename components (*id*. at 4:2-3; 6:45-53; 7:11-41; 8:18-41), the use of steganographic embedding of metadata directly into the data element so that metadata survives transfer (*id*. at 4:13-23), and a certificate/hash-based authentication workflow that ties metadata to stored elements and supports authenticated retrieval (*id*. at 4:45-59; 5:4-11; 5:18-32); and (iii) a tag generator and automated tag-creation pipeline

(speech-to-text for audio-derived tags; image recognition for image-derived tags) such that searchable "context" tags are produced automatically and associated with the stored image for later indexed retrieval (*id*. at 5:39-58; 7:42-61; 10:3-12). These specific structures and steps—recited in the claims and described in the specification—explain how the claimed invention achieved the asserted storage savings, automated searchability, and metadata preservation across transfers, rather than merely describing a new goal or result.

29. The claims of the Patents-in-Suit recite specific components and ordered steps that constitute an inventive concept and not merely a well-understood, routine or conventional computer implementation of an abstract idea. The claims do not simply recite "tagging" or "indexing" in the abstract; rather, they require (a) bounded capture of data as a defined set (start/stop event and transmission after completion) (*id*. at Abstract; 3:5-15; 10:62-67; 11:41-46; 12:8-13; 12:49-54), (b) an explicit combiner/compressor that creates a recoverable composite data set and reduces storage/transmission resource usage (*id*. at 8:64-66; 9:13-23; 11:22-24), (c) explicit mechanisms for converting audio and data into context tags, and associating these context tags with the captured image and transmitting and storing those tags in association with the image in a database (*id*. at 8:2-17; 10:48-54; 11:17-35; 11:48-51; 12:5-7; 12:14-19; 12:29-41), and (d) concrete preservation and authentication mechanisms (file-format designators/UIDs and steganographic embedding or certificate/hash procedures) that prevent loss of index keys on device migration or transfer (*id*. at 4:2-3; 4:13-23 4:45-59; 5:4-11; 5:18-32; 6:45-53; 7:11-41; 8:18-41). These claimed and described features are technical in nature (specific data structures, specific data flows, specific capture/transfer ordering, specific compression/combining and recoverability guarantees, and specific metadata-embedding/authentication steps) and plainly supply significantly more than the abstract idea of merely "converting audio to text, generating image-

recognition tags, associating the text and image tags with the image, and storing the image in association with those tags." Read together, the claims and specification recite concrete combiner/compressor behavior and recoverability, a temporally-defined "stored defined set" capture/transfer flow, automated tag generation, file-format identifiers/sequence-number examples, and steganographic and certificate/hash processes for preserving and authenticating tags and data during storage and transfer. These facts demonstrate that the claims are directed to a technological improvement in computer and network functionality and recite an inventive combination of elements that are neither generic nor routine.

30. In sum, the claims of the Patents-in-Suit recite patent-eligible subject matter under 35 U.S.C. § 101 because they embody inventive concepts that improve the operation of digital devices, employ unconventional structures and ordered combinations, and provide specific solutions to problems that were unique to computer technology at the time of the invention.

31. The importance of the above-described innovations is reflected in the fact that the Patents-in-Suit have been cited as prior art in over 100 subsequent patent applications around the world by leading technology companies including Google, Sony, IBM, and Cisco Technology, demonstrating their recognized role as technological advancements.

32. Further, Apple attempted to patent similar MyPort technology when it filed its own patent application for an invention titled "Voice-Based Image Tagging and Searching" on March 13, 2013, years after the priority date for the Patents-in-Suit. *See* Appl. No. 13/801,534; Pub. No. US 2013/0346068. Apple abandoned the application after the Patent Office rejected the application.

33. The written description for each Patent-in-Suit supports each of the elements of the claims, allowing a person of skill in the art to understand what the elements cover and how the

non-conventional and non-routine combination of claim elements differed markedly from and improved upon an isolated element that may have been considered conventional, generic, or routine.

ALLEGATIONS OF PATENT INFRINGEMENT

34. Apple makes, uses, sells, offers for sale, and/or imports certain products and systems, that include, but are not limited to, smartphones and tablets ("Accused Products"). Identification of the Accused Products will be provided in Plaintiff's infringement contentions pursuant to the Court's scheduling order and local rules. Non-limiting examples of the Accused Products include different versions of the Apple smartphones and tablets, such as the iPhone 6 / 6 Plus; iPhone 6S / 6S Plus; iPhone SE (1st); iPhone 7 / 7 Plus; iPhone 8 / 8 Plus; iPhone X; iPhone XS / XS Max; iPhone XR; iPhone 11; iPhone 11 Pro / 11 Pro Max; iPhone SE (2nd); iPhone 12 / 12 Mini; iPhone 12 Pro / 12 Pro Max; iPhone 13 / 13 Mini; iPhone 13 Pro / 13 Pro Max; iPhone SE (3rd); iPhone 14 / 14 Plus; iPhone 14 Pro / 14 Pro Max; iPhone 15 / 15 Plus; iPhone 15 Pro / 15 Pro Max; iPad Air (1st generation); iPad Mini 2; iPad Mini 3; iPad Air 2; iPad Mini 4; iPad Pro (1st generation); iPad (5th generation); iPad Pro (2nd generation); iPad (6th generation); iPad Pro (3rd generation); iPad Mini (5th generation); iPad Air (3rd generation); iPad (7th generation); iPad Pro (4th generation); iPad (8th generation); iPad Air (4th generation); iPad Pro (5th generation); iPad (9th generation); iPad Mini (6th generation); iPad Air (5th generation); iPad Pro (6th generation); iPad (10th generation). These Accused Products directly infringe, literally and/or under the doctrine of equivalents, one or more claims of each of the Patents-in-Suit.

35. MyPort sent a letter to Apple on October 13, 2020 ("Notice Letter"), identifying MyPort patents, including each of the Patents-in-Suit, and specifically alleged that "Apple's iPad, iPad Mini, iPhone, and iPod Touch infringe least the following claims: '017 patent claims 13-17;

'067 patent claims 6-9 and 13-17; and '066 patent claims 13-17" and included claim charts enclosing the same. In response to MyPort's Notice Letter, legal counsel for MyPort and Apple spoke on the phone on or about December 1, 2020, to discuss the substance of MyPort's allegations. Apple then responded to the Notice Letter on or about January 12, 2021, and the parties exchanged subsequent correspondence on March 19, 2021 and April 19, 2021. As such, Apple knew that it infringed the Patents-in-Suit at least as early as October 13, 2020.

36. MyPort's Notice Letter also referenced that MyPort and Apple had engaged in licensing discussions in 2011 regarding related patents, and referenced an in-person meeting between MyPort and Apple on September 30, 2011. Thus, Apple has been aware or should have been aware, of MyPort's patent portfolio and the Patents-in-Suit prior to the Notice Letter, especially considering that MyPort's patents are publicly available and are widely cited in the field of speech and image tagging, as noted above.

37. MyPort has, to the extent required, complied with the marking statute, 35 U.S.C. § 287.

38. As set forth below, the Accused Products incorporate, without any license or permission from MyPort, technology protected by the Patents-in-Suit.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 9,832,017

39. MyPort reasserts and incorporates herein by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

40. Apple has infringed at least claim 13 and one or more of its dependents of the '017 Patent under 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering for sale in the United States, and/or importing into the United States, the Accused Products.

41. As just one non-limiting example, set forth below with claim language in italics is a description of infringement of exemplary claim 13 of the '017 Patent (MyPort reserves the right to modify this description, including on the basis of information it obtains during discovery): *a system for capturing image and audio information for storage comprising*: To the extent the preamble is limiting, the Accused Products, such as the iPad Mini 5, contains a camera for capturing image information and a microphone capable of capturing audio information, and memory capable of storing this information.

iPad mini (5th generation) – Technical Specifications

* * *

Camera

- 8-megapixel camera
- ƒ/2.4 aperture
- Five-element lens
- Hybrid IR filter
- Backside illumination
- Live Photos

* * *

Video Recording

- 1080p HD video recording
- Slo-mo (240 fps)
- Time-lapse video with stabilization
- Video image stabilization
- 3x video zoom
- Video geotagging

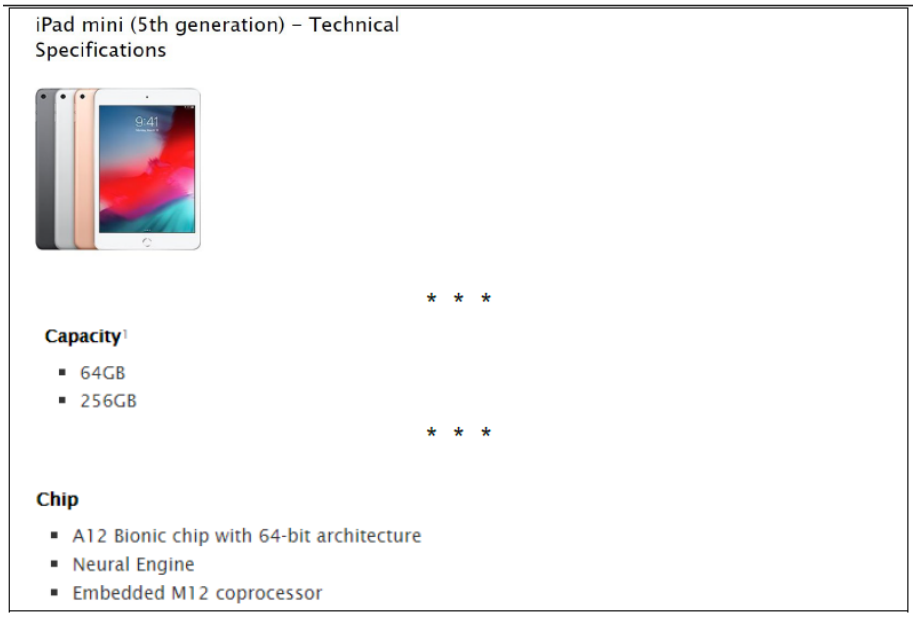
* * *

Microphones

- Dual microphones for calls, video recording, and audio recording

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

42. The Accused Products include *internal storage*. The Accused Products, such as the iPad Mini 5, provide flash memory, cache memory, and RAM to store information.



iPad mini (5th generation) – Technical Specifications

* * *

Capacity[1]

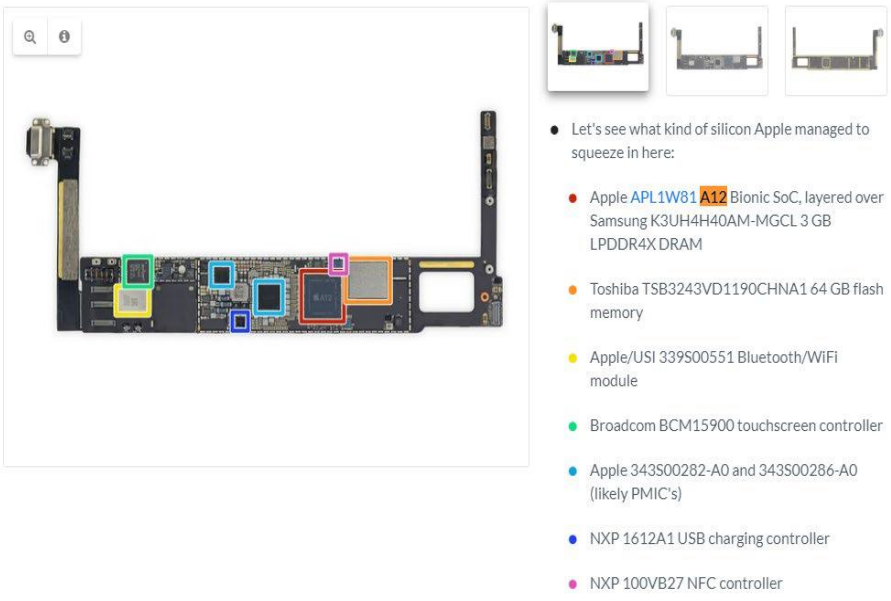
- 64GB
- 256GB

* * *

Chip

- A12 Bionic chip with 64-bit architecture
- Neural Engine
- Embedded M12 coprocessor

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

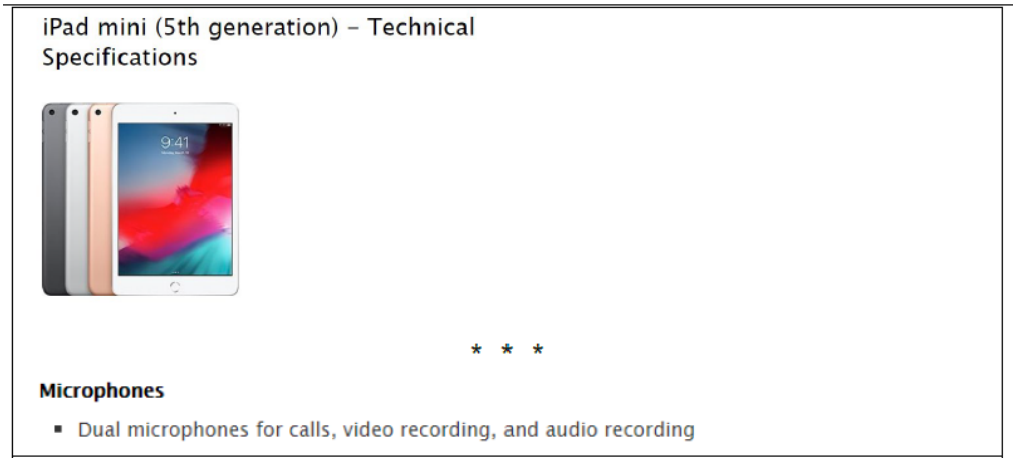


- Let's see what kind of silicon Apple managed to squeeze in here:
- Apple APL1W81 A12 Bionic SoC, layered over Samsung K3UH4H40AM-MGCL 3 GB LPDDR4X DRAM
- Toshiba TSB3243VD1190CHNA1 64 GB flash memory
- Apple/USI 339S00551 Bluetooth/WiFi module
- Broadcom BCM15900 touchscreen controller
- Apple 343S00282-A0 and 343S00286-A0 (likely PMIC's)
- NXP 1612A1 USB charging controller
- NXP 100VB27 NFC controller

Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).

43. The Accused Products include *a microphone interfaceable with external audio information source that generates external audio information*. The Accused Products, such as the iPad Mini 5, contain a microphone capable of recording audio information from an external audio

information source. For example, the microphone can record the words of a user who dictates into the microphone.



Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).

44. The Accused Products include *a first data converter for capturing the first external audio information from the microphone.* The Accused Products, such as the iPad Mini 5, use the device processor and software for capturing the external audio information from the microphone.

Dictate text on iPhone

With Dictation on iPhone, you can dictate text anywhere you can type it. You can also use typing and Dictation together—the keyboard stays open during Dictation so you can easily switch between voice and touch to enter text.

Dictation requests are processed on your device in many languages—no internet connection is required. When dictating in a search box, dictated text may be sent to the search provider in order to process the search.

Note: Dictation may not be available in all languages or in all countries or regions, and features may vary. See the iOS and iPadOS Feature Availability website.

When using Dictation, cellular data charges may apply. See View or change cellular data settings.

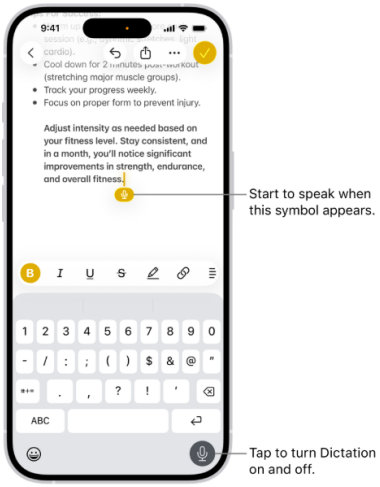
Turn on Dictation

1. Go to the Settings app on your iPhone.
2. Tap General, then tap Keyboard.
3. Turn on Enable Dictation. If a prompt appears, tap Enable Dictation.

To learn more about how Apple protects your information and lets you choose what you share, tap About Dictation & Privacy below Dictation, or see the Apple Privacy website.

Dictate text

Dictate text and use voice commands to edit and format content.



Source: support.apple.com/en-us/HT208343 (last accessed Oct. 9, 2025).

45. The Accused Products include *a camera interfacing with an image source to capture an image therefrom.* The camera of the Accused Products, such as the iPad Mini 5, interfaces with an image source. It senses the image and converts it to a series of quantized pixels that, in aggregate, make up the image.

iPad mini (5th generation) – Technical Specifications

* * *

Camera

- 8-megapixel camera
- ƒ/2.4 aperture
- Five-element lens
- Hybrid IR filter
- Backside illumination
- Live Photos

* * *

Video Recording

- 1080p HD video recording
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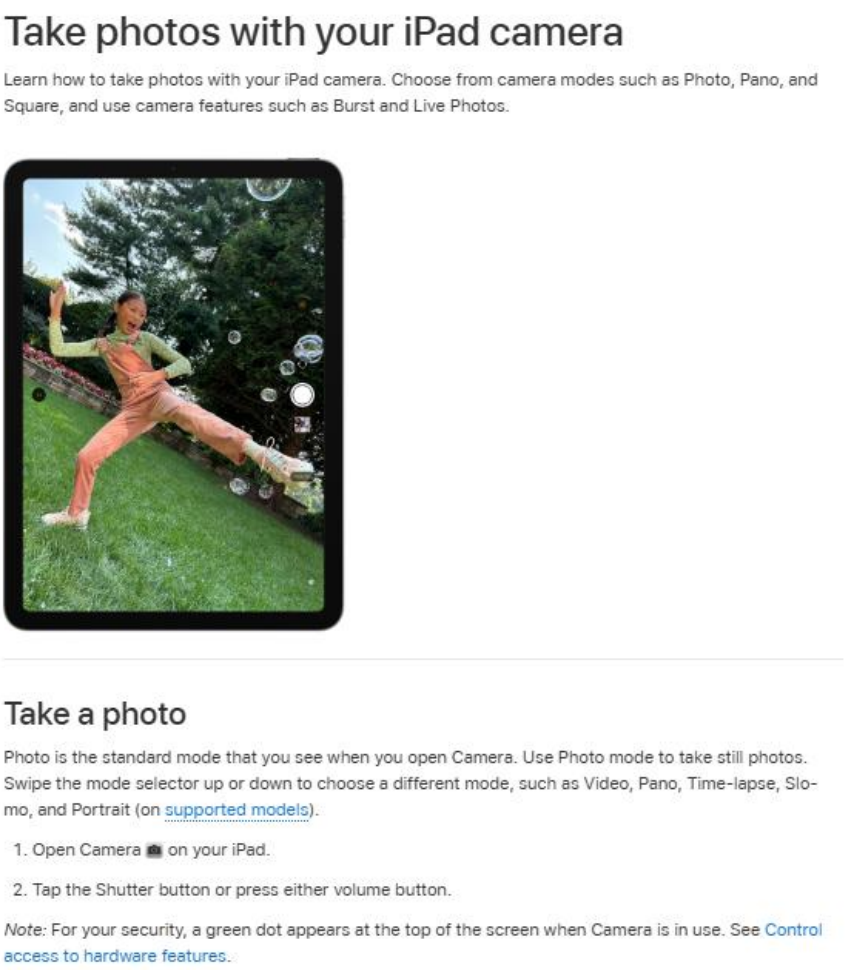
- 3x video zoom
- Video geotagging

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).



Take photos with your iPad camera

Learn how to take photos with your iPad camera. Choose from camera modes such as Photo, Pano, and Square, and use camera features such as Burst and Live Photos.

Take a photo

Photo is the standard mode that you see when you open Camera. Use Photo mode to take still photos. Swipe the mode selector up or down to choose a different mode, such as Video, Pano, Time-lapse, Slo-mo, and Portrait (on supported models).

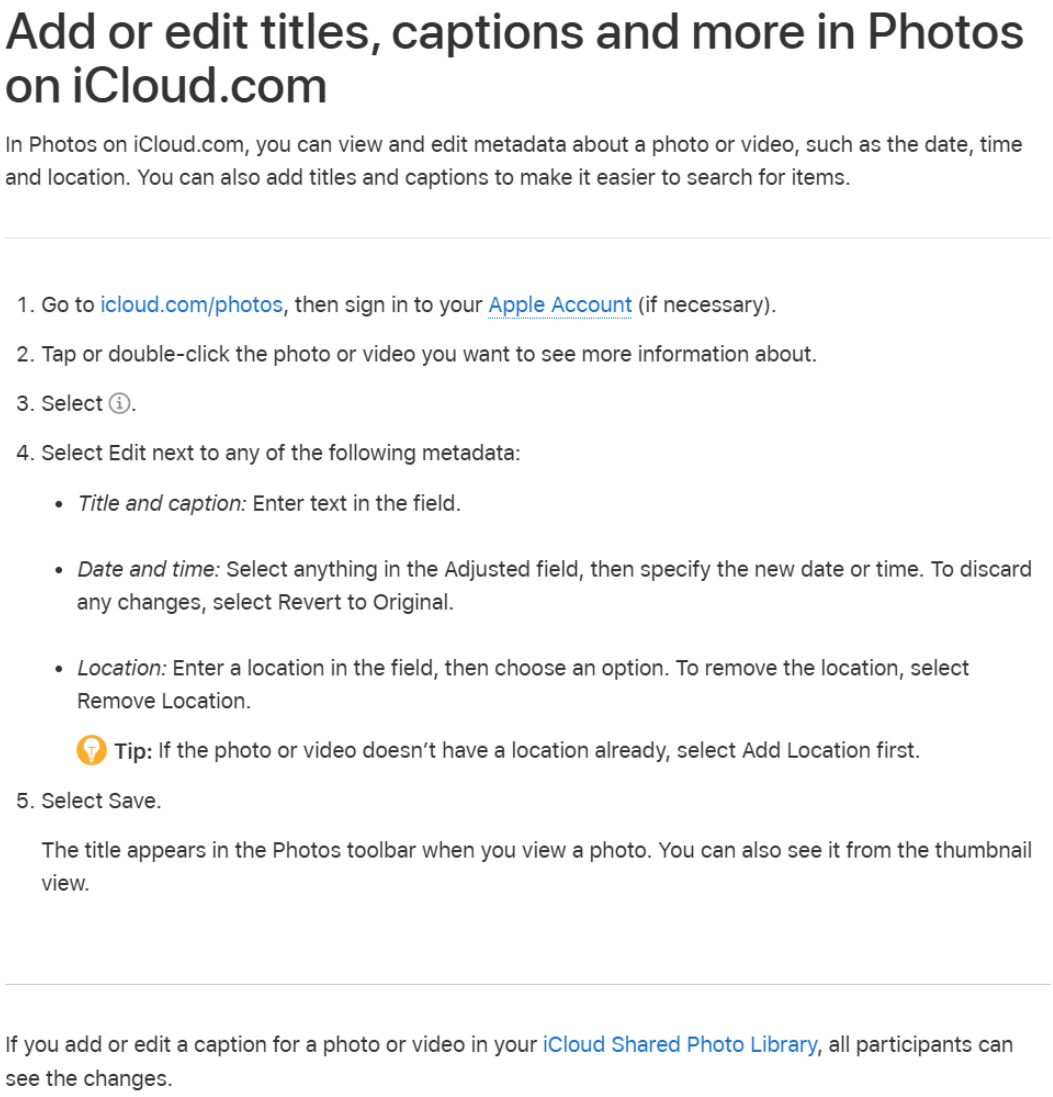
1. Open Camera on your iPad.
2. Tap the Shutter button or press either volume button.

Note: For your security, a green dot appears at the top of the screen when Camera is in use. See Control access to hardware features.

Source: support.apple.com/guide/ipad/take-photos-ipad99b53a71//18.0/ipados (last accessed Oct. 9, 2025).

46. The Accused Products include *the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio within the capture device, the camera for processing the captured image and storing it as a stored digital image.* Each Accused Product includes a first data converter (e.g., relevant portions of the processor and associated software) that processes the user's words dictated into the microphone (i.e., the captured external audio information) to convert the external audio information into digital audio data and further stores it as digital audio in the device's memory. Each Accused Product has

a camera (including the use of relevant portions of the processor and associated software) that processes images and stores the images as a digital file.



Add or edit titles, captions and more in Photos on iCloud.com

In Photos on iCloud.com, you can view and edit metadata about a photo or video, such as the date, time and location. You can also add titles and captions to make it easier to search for items.

1. Go to icloud.com/photos, then sign in to your Apple Account (if necessary).
2. Tap or double-click the photo or video you want to see more information about.
3. Select ⓘ.
4. Select Edit next to any of the following metadata:
   - *Title and caption:* Enter text in the field.
   - *Date and time:* Select anything in the Adjusted field, then specify the new date or time. To discard any changes, select Revert to Original.
   - *Location:* Enter a location in the field, then choose an option. To remove the location, select Remove Location.

     Tip: If the photo or video doesn't have a location already, select Add Location first.
5. Select Save.

   The title appears in the Photos toolbar when you view a photo. You can also see it from the thumbnail view.

If you add or edit a caption for a photo or video in your iCloud Shared Photo Library, all participants can see the changes.

Source: https://support.apple.com/en-au/guide/icloud/mm54e2d3fb7a/icloud#:~:text=You%20can%20view%20metadata%20about,Apple%20Account%20(if%20necessary) (last accessed Oct. 9, 2025).

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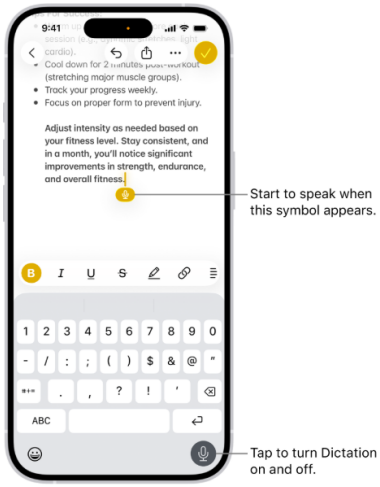
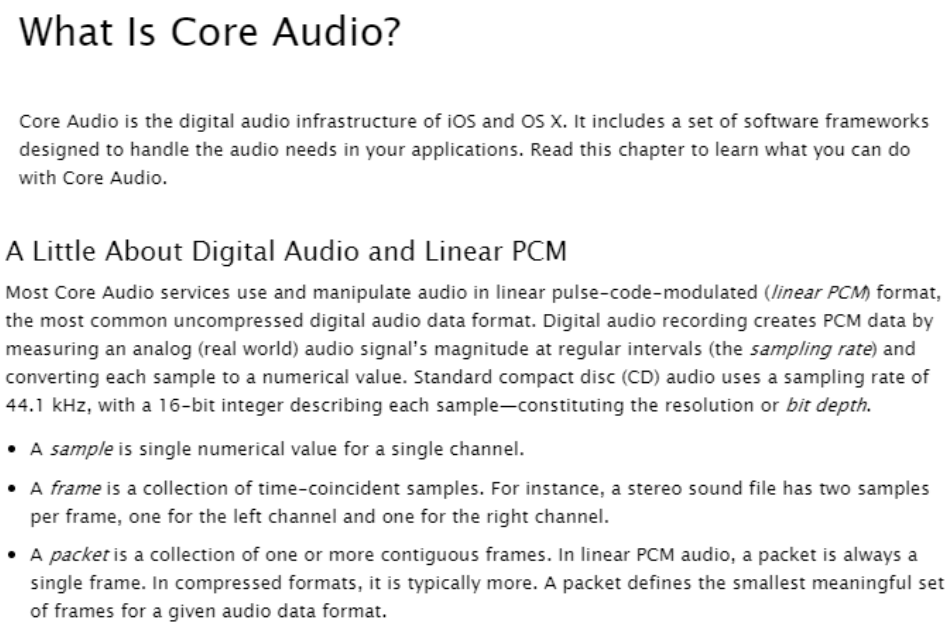


Source: support.apple.com/en-us/HT208343 (last accessed Oct. 9, 2025).



What Is Core Audio?

Core Audio is the digital audio infrastructure of iOS and OS X. It includes a set of software frameworks designed to handle the audio needs in your applications. Read this chapter to learn what you can do with Core Audio.

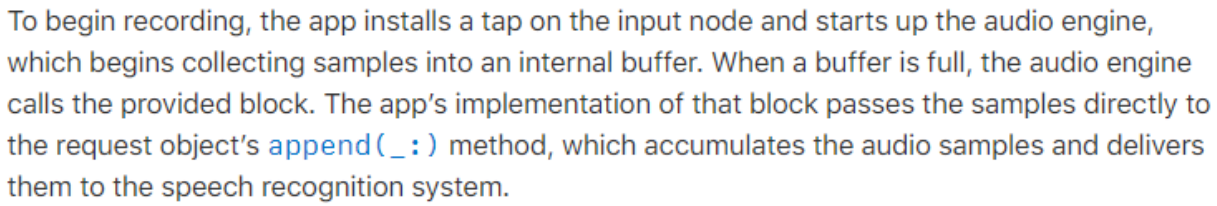
A Little About Digital Audio and Linear PCM

Most Core Audio services use and manipulate audio in linear pulse-code-modulated (*linear PCM*) format, the most common uncompressed digital audio data format. Digital audio recording creates PCM data by measuring an analog (real world) audio signal's magnitude at regular intervals (the *sampling rate*) and converting each sample to a numerical value. Standard compact disc (CD) audio uses a sampling rate of 44.1 kHz, with a 16-bit integer describing each sample—constituting the resolution or *bit depth*.

- A *sample* is single numerical value for a single channel.
- A *frame* is a collection of time-coincident samples. For instance, a stereo sound file has two samples per frame, one for the left channel and one for the right channel.
- A *packet* is a collection of one or more contiguous frames. In linear PCM audio, a packet is always a single frame. In compressed formats, it is typically more. A packet defines the smallest meaningful set of frames for a given audio data format.

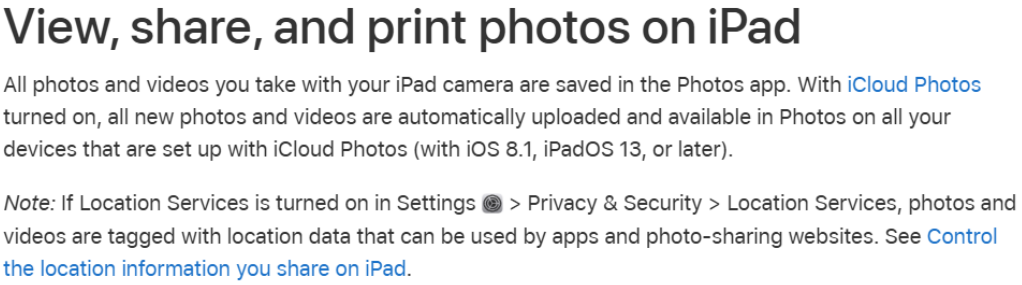
Source:

developer.apple.com/library/archive/documentation/MusicAudio/Conceptual/CoreAudioOverview/WhatisCoreAudio/WhatisCoreAudio.html#//apple_ref/doc/uid/TP40003577-CH3-SW1 (last accessed Oct. 9, 2025).



To begin recording, the app installs a tap on the input node and starts up the audio engine, which begins collecting samples into an internal buffer. When a buffer is full, the audio engine calls the provided block. The app's implementation of that block passes the samples directly to the request object's `append(_:)` method, which accumulates the audio samples and delivers them to the speech recognition system.

Source: developer.apple.com/documentation/speech/recognizing_speech_in_live_audio (last accessed Oct. 9, 2025).

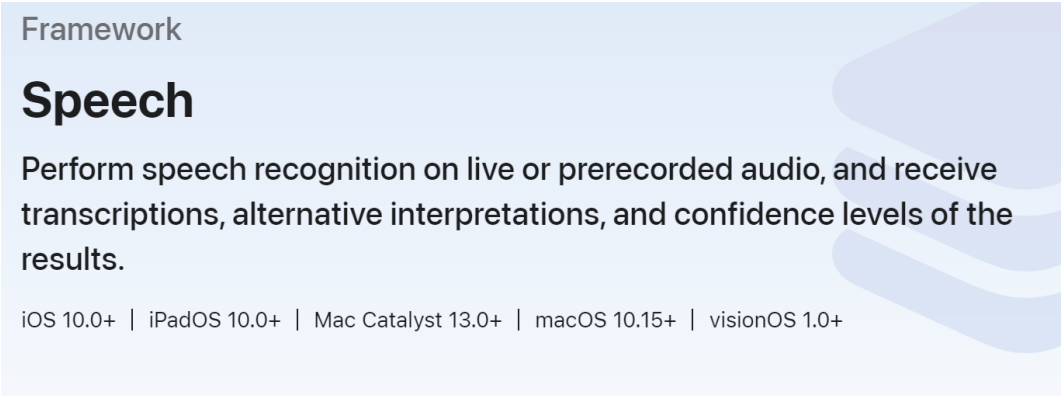


View, share, and print photos on iPad

All photos and videos you take with your iPad camera are saved in the Photos app. With iCloud Photos turned on, all new photos and videos are automatically uploaded and available in Photos on all your devices that are set up with iCloud Photos (with iOS 8.1, iPadOS 13, or later).

Note: If Location Services is turned on in Settings > Privacy & Security > Location Services, photos and videos are tagged with location data that can be used by apps and photo-sharing websites. See Control the location information you share on iPad.

Source: support.apple.com/guide/ipad/view-share-and-print-photos-ipad99b53b6d/ipados/18.0 (last accessed Oct. 9, 2025).



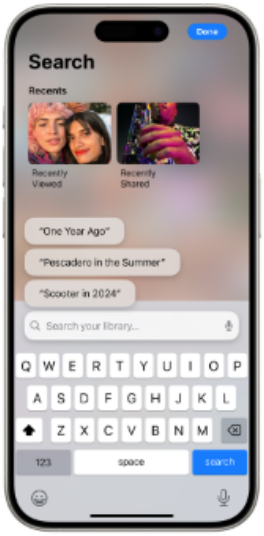
Source: developer.apple.com/documentation/speech (last accessed Oct. 9, 2025).

47. The Accused Products include *a second data converter for converting the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image*. When the Accused Products capture spoken audio, the Accused Products can perform speech recognition. The speech recognition converts the digital audio into text in the image's tag field. The Accused Products also use machine learning (or image recognition) to automatically apply image recognition tags to photos stored on the device.

Search for photos and videos on iPhone

When you tap Search in the Photos app, you see suggestions of dates, people, and locations to help you find what you're looking for.

Tap the suggestions or type keywords into the search field—for example, a person's name, date, location, or object—to help you find a specific photo.



Search for photos and videos

1. Go to the Photos app on your iPhone.
2. Tap Search, then search by any of the following:

- Date (month or year)
- Place (city or state)
- Business names (museums, for example)
- Category (beach or sunset, for example)
- Events (sports games or concerts, for example)
- A person identified in People & Pets (see Find and name people and pets)
- Text (an email address or phone number, for example)
- Caption (see See photo and video information)

Tip: Looking for something more specific? Refine your search with multiple keywords—keep adding keywords until you find the right photo. Search also suggests keywords to add to your search.

Source: https://support.apple.com/guide/iphone/search-for-photos-and-videos-iph392d77d5f/18.0/ios/18.0 (last accessed Oct. 9, 2025)

See also Apple Photos.

48. As shown above, the Accused Products include *internal storage storing the digital image in association with the text and image recognition context tags*. The Accused Products, such as the iPad Mini 5, provide flash memory, cache memory, and RAM to store information.

49. Apple has committed acts of infringement without license or authorization. Apple knew or should have known that its actions would cause direct and indirect infringement of the '017 Patent. On information and belief, Apple acted with objective recklessness by proceeding despite an objective high likelihood that its actions constituted infringement of a valid patent, where such action constitutes egregious misconduct and willful infringement.

50. Apple is also liable under 35 U.S.C. § 271(b) for actively inducing infringement and continuing to actively induce infringement. Apple actively induced its customers, distributors, end-users, vendors including customer-support and/or manufacturers to infringe the '017 Patent. On information and belief, Apple possessed a specific intent to induce infringement, and in fact did induce infringement, by engaging in affirmative acts such as by selling and causing the Accused Products to be manufactured, by providing user guides, installation or instruction manuals, and other training materials, by advertising and solicitation and otherwise providing sales-related materials, and by instructing and/or demonstrating to customers, distributors, end-users, vendors including customer-support and/or manufacturers the normal operation of the Accused Products that infringe the '017 Patent. Non-limiting examples of such are found above in the various screenshots that instruct performance of the infringing use of the technology. Apple is aware and/or willfully blind that these affirmative acts infringe and/or would induce infringement of the '017 Patent, of which it had knowledge.

51. Apple is also liable under 35 U.S.C. § 271(c) for contributing to and continuing to contribute to the infringement of the '017 Patent by, among other things, providing a system for

capturing image and audio information for storage in its Accused Products and by encouraging, at a minimum, customers, distributors, end-users, vendors including customer-support and/or manufacturers in this District and elsewhere, to infringe the '017 Patent. By importing, exporting, manufacturing, distributing, selling, and/or providing the Accused Products and/or Services for their intended use to customers, distributors, end-users, vendors including customer-support and/or manufacturers, Apple has infringed one or more claims of the '017 Patent. The infringing functionality in the Accused Products is material to the inventions claimed in the '017 Patent, has no substantial non-infringing uses, and is known to Apple (on information and belief) to be especially made or adapted for use in infringing the '017 Patent, and which is otherwise not staple articles of commerce suitable for substantial non-infringing use. There are no non-infringing uses for the infringing functionality in the Accused Products other than to create searchable tags as associated metadata for image and/or audio files. Apple is aware and/or willfully blind that these affirmative acts infringe and/or constitute contributory infringement of the '017 Patent, of which it had knowledge.

52. Apple is liable for indirect infringement, i.e., both inducement and contributory infringement, based on the direct infringement that is the result of activities performed by customers, distributors, end-users, vendors including customer-support and/or manufacturers who use all elements or perform all steps of one or more claims of the '017 Patent. For example, end users of Apple's Accused Products infringe, either directly or under the doctrine of equivalents, one or more claims of the '017 Patent (*e.g.*, claim 13 and one or more of its dependents). At a minimum, Apple is liable for the indirect infringement of claim 13 and one or more of its dependents of the '017 Patent.

53. MyPort has been damaged because of Apple's infringing conduct. Apple is, thus, liable to MyPort in an amount that adequately compensates MyPort for Apple's infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT II: INFRINGEMENT OF U.S. PATENT NO. 10,237,067

54. MyPort reasserts and incorporates herein by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

55. Apple has infringed at least claim 6 and one or more of its dependents of the '067 Patent under 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering for sale in the United States, and/or importing into the United States, the Accused Products.

56. As just one non-limiting example, set forth below with claim language in italics is a description of infringement of exemplary claim 6 of the '067 Patent (MyPort reserves the right to modify this description, including on the basis of information it obtains during discovery): *a system for capturing image and audio information for storage comprising: a capture device*: To the extent the preamble is limiting, the Accused Products, such as the iPad Mini 5, contains a camera for capturing image information and a microphone capable of capturing audio information, and memory capable of storing this information.

iPad mini (5th generation) – Technical Specifications

* * *

Camera

- 8-megapixel camera
- ƒ/2.4 aperture
- Five-element lens
- Hybrid IR filter
- Backside illumination
- Live Photos

* * *

Video Recording

- 1080p HD video recording
- Slo-mo (240 fps)
- Time-lapse video with stabilization
- Video image stabilization
- 3x video zoom
- Video geotagging

* * *

Microphones

- Dual microphones for calls, video recording, and audio recording

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025)

57. The Accused Products include *internal storage*. The Accused Products, such as the iPad Mini 5, provide flash memory, cache memory, and RAM to store information.

iPad mini (5th generation) – Technical Specifications

* * *

Capacity[1]

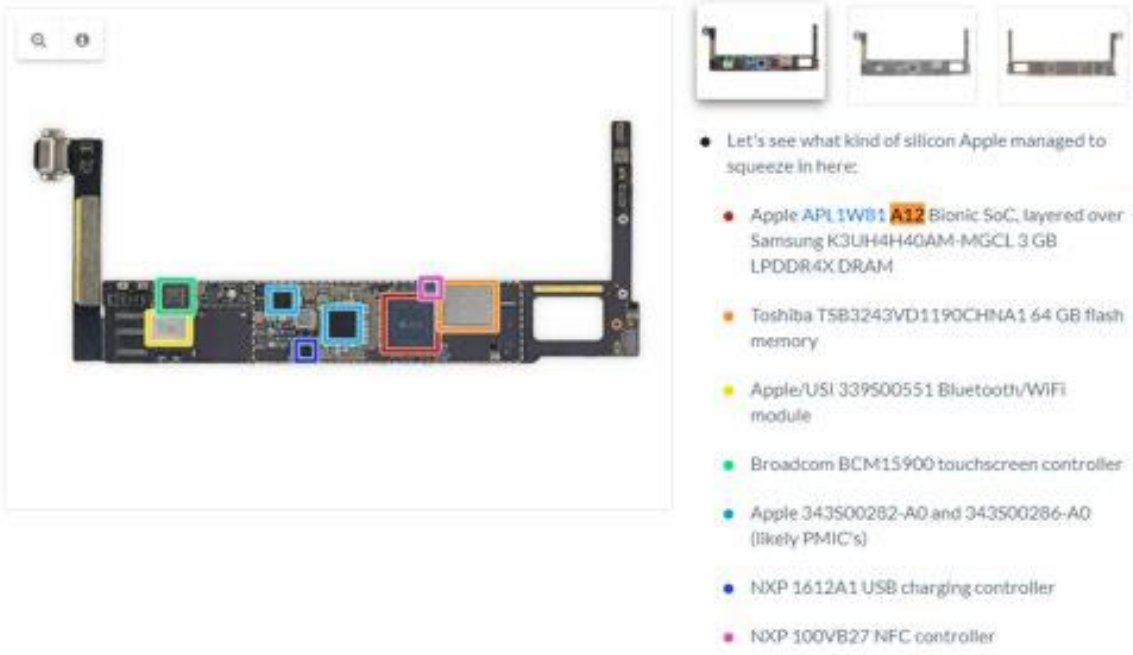
- 64GB
- 256GB

* * *

Chip

- A12 Bionic chip with 64-bit architecture
- Neural Engine
- Embedded M12 coprocessor

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).



Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).

58. The Accused Products include *a microphone interfaceable with an external audio information source that generates external audio information.* The Accused Products, such as the iPad Mini 5, contain a microphone capable of recording audio information from an external audio

information source. For example, the microphone can record the words of a user who dictates into the microphone.

iPad mini (5th generation) – Technical Specifications

* * *

Microphones

- Dual microphones for calls, video recording, and audio recording

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).

59. The Accused Products include *a first data converter for capturing the first external audio information from the microphone*. The Accused Products, such as the iPad Mini 5, uses the device processor and software for capturing the external audio information from the microphone.

Dictate text on iPhone

With Dictation on iPhone, you can dictate text anywhere you can type it. You can also use typing and Dictation together—the keyboard stays open during Dictation so you can easily switch between voice and touch to enter text.

Dictation requests are processed on your device in many languages—no internet connection is required. When dictating in a search box, dictated text may be sent to the search provider in order to process the search.

Note: Dictation may not be available in all languages or in all countries or regions, and features may vary. See the iOS and iPadOS Feature Availability website.

When using Dictation, cellular data charges may apply. See View or change cellular data settings.

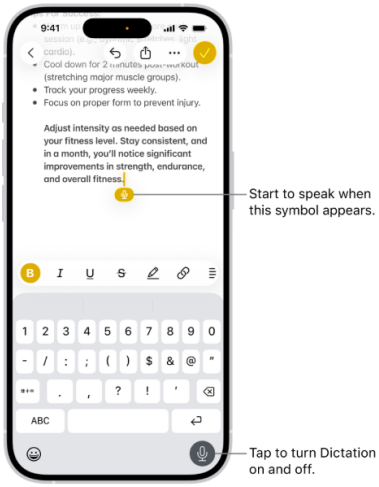
Turn on Dictation

1. Go to the Settings app on your iPhone.
2. Tap General, then tap Keyboard.
3. Turn on Enable Dictation. If a prompt appears, tap Enable Dictation.

To learn more about how Apple protects your information and lets you choose what you share, tap About Dictation & Privacy below Dictation, or see the Apple Privacy website.

Dictate text

Dictate text and use voice commands to edit and format content.



Source: support.apple.com/en-us/HT208343 support.apple.com/en-us/HT208343 (last accessed Oct. 9, 2025).

60. The Accused Products include *a camera interfacing with an external image source to capture an image therefrom.* The camera of the Accused Products, such as the iPad Mini 5, interfaces with an image source. It senses the image and converts it to a series of quantized pixels that, in aggregate, make up the image.

iPad mini (5th generation) – Technical Specifications

* * *

Camera

- 8-megapixel camera
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* * *

Video Recording

- 1080p HD video recording
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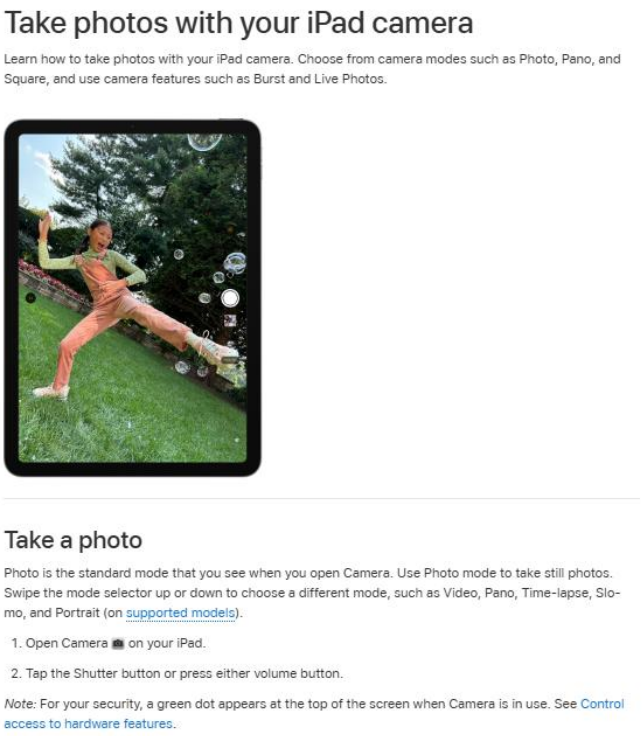
Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).



Source: support.apple.com/guide/ipad/take-photos-ipad99b53a71//18.0/ipados (last accessed Oct. 9, 2025).

61. The Accused Products include *the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio in internal storage within the capture device, the camera for processing the captured image and storing it as a stored digital image in internal storage.* Each Accused Product includes a first data converter (e.g., relevant portions of the processor and associated software) that processes the user's words dictated into the microphone (i.e., the captured external audio information) to convert the external audio information into digital audio data and further stores it as digital audio in the device's memory. Each Accused Product has a camera (including the use of relevant portions of the processor and associated software) that processes images and stores the images as a digital file.

Add or edit titles, captions and more in Photos on iCloud.com

In Photos on iCloud.com, you can view and edit metadata about a photo or video, such as the date, time and location. You can also add titles and captions to make it easier to search for items.

1. Go to icloud.com/photos, then sign in to your Apple Account (if necessary).
2. Tap or double-click the photo or video you want to see more information about.
3. Select ⓘ.
4. Select Edit next to any of the following metadata:
   - *Title and caption:* Enter text in the field.
   - *Date and time:* Select anything in the Adjusted field, then specify the new date or time. To discard any changes, select Revert to Original.
   - *Location:* Enter a location in the field, then choose an option. To remove the location, select Remove Location.

     Tip: If the photo or video doesn't have a location already, select Add Location first.
5. Select Save.

   The title appears in the Photos toolbar when you view a photo. You can also see it from the thumbnail view.

If you add or edit a caption for a photo or video in your iCloud Shared Photo Library, all participants can see the changes.

Source: https://support.apple.com/en-au/guide/icloud/mm54e2d3fb7a/icloud#:~:text=You%20can%20view%20metadata%20about,Apple%20Account%20(if%20necessary) (last accessed Oct. 9, 2025).

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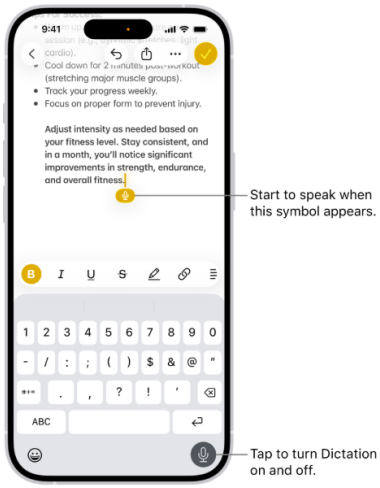

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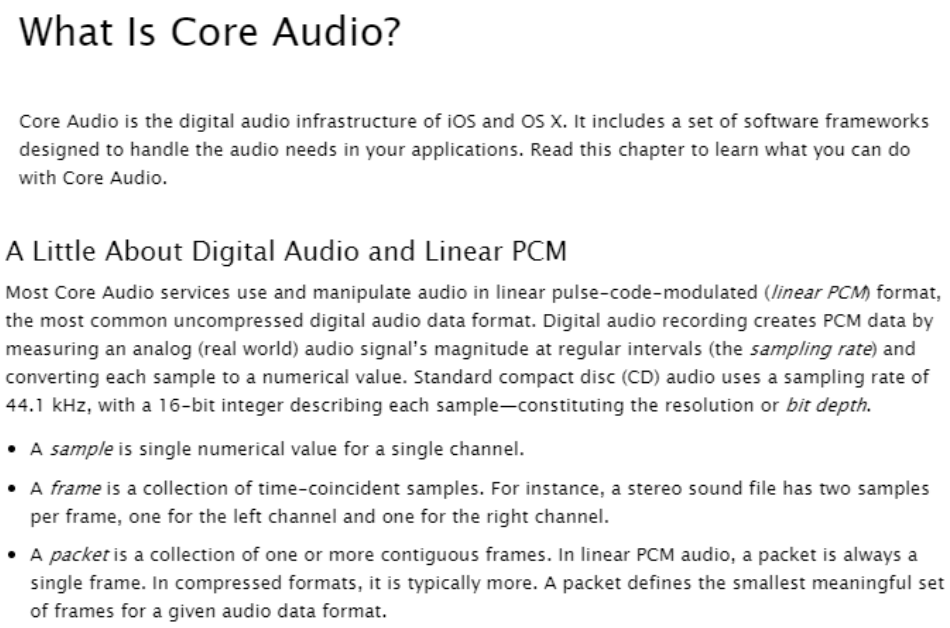

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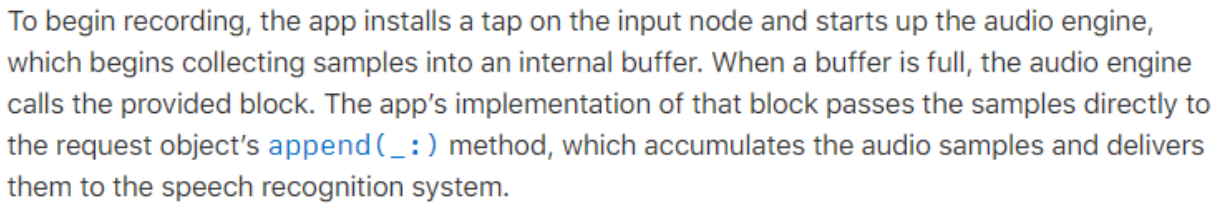
Source:

developer.apple.com/library/archive/documentation/MusicAudio/Conceptual/CoreAudioOverview/WhatisCoreAudio/WhatisCoreAudio.html#//apple_ref/doc/uid/TP40003577-CH3-SW1 (last accessed Oct. 9, 2025).



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Source: developer.apple.com/documentation/speech/recognizing_speech_in_live_audio.

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Note: If Location Services is turned on in Settings > Privacy & Security > Location Services, photos and videos are tagged with location data that can be used by apps and photo-sharing websites. See Control the location information you share on iPad.

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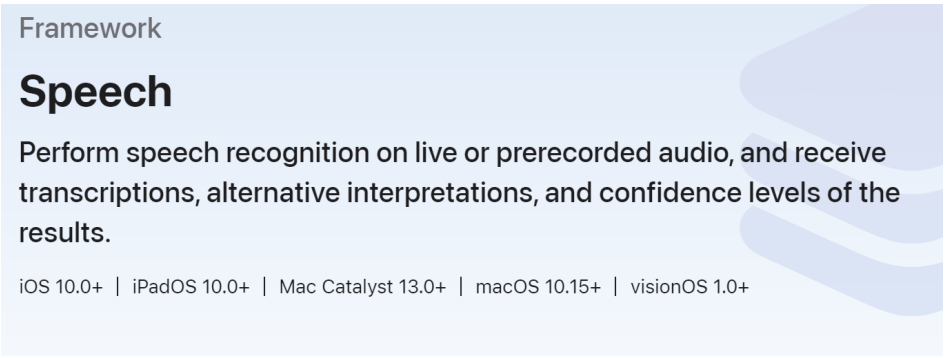
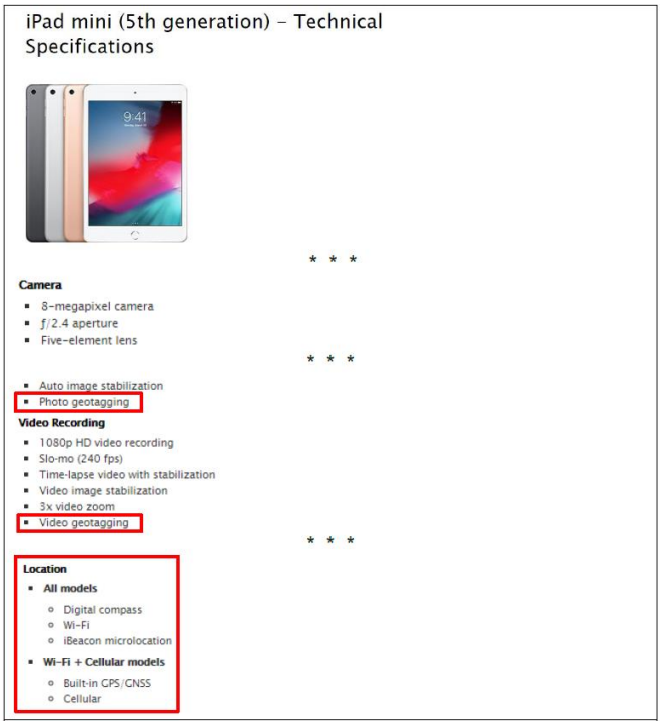


Source: developer.apple.com/documentation/speech (last accessed Oct. 9, 2025).

62. The Accused Products include *capturing, as captured data, location information and time information associated with at least the capture of the image and storing the captured data as stored captured data.* The Accused Products include location settings that allow the mobile device to determine location and time information of a captured image.



iPad mini (5th generation) – Technical Specifications

* * *

Camera

- 8-megapixel camera
- ƒ/2.4 aperture
- Five-element lens

* * *

- Auto image stabilization
- Photo geotagging

Video Recording

- 1080p HD video recording
- Slo-mo (240 fps)
- Time-lapse video with stabilization
- Video image stabilization
- 3x video zoom
- Video geotagging

* * *

Location

- **All models**
  - Digital compass
  - Wi-Fi
  - iBeacon microlocation
- **Wi-Fi + Cellular models**
  - Built-in GPS/GNSS
  - Cellular

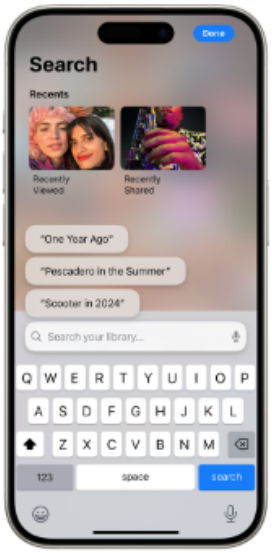
Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

63. The Accused Products include *a media data converter for converting the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image and captured data.* When the Accused Products capture spoken audio, the Accused Products can perform speech recognition. The speech recognition converts the digital audio into text in the image's tag field. The Accused Products also use machine learning (or image recognition) to automatically apply image recognition tags to photos on the device.

Search for photos and videos on iPhone

When you tap Search in the Photos app, you see suggestions of dates, people, and locations to help you find what you're looking for.

Tap the suggestions or type keywords into the search field—for example, a person's name, date, location, or object—to help you find a specific photo.



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1. Go to the Photos app on your iPhone.
2. Tap Search, then search by any of the following:

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- Business names (museums, for example)
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Tip: Looking for something more specific? Refine your search with multiple keywords—keep adding keywords until you find the right photo. Search also suggests keywords to add to your search.

Source: https://support.apple.com/guide/iphone/search-for-photos-and-videos-iph392d77d5f/18.0/ios/18.0 (last accessed Oct. 9, 2025)

See also Apple Photos.

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65. Apple has committed acts of infringement without license or authorization. Apple knew or should have known that its actions would cause direct and indirect infringement of the '067 Patent. On information and belief, Apple acted with objective recklessness by proceeding despite an objective high likelihood that its actions constituted infringement of a valid patent, where such action constitutes egregious misconduct and willful infringement.

66. Apple is also liable under 35 U.S.C. § 271(b) for actively inducing infringement and continuing to actively induce infringement. Apple actively induced its customers, distributors, end-users, vendors including customer-support and/or manufacturers to infringe the '067 Patent. On information and belief, Apple possessed a specific intent to induce infringement, and in fact did induce infringement, by engaging in affirmative acts such as by selling and causing the Accused Products to be manufactured, by providing user guides, installation or instruction manuals, and other training materials, by advertising and solicitation and otherwise providing sales-related materials, and by instructing and/or demonstrating to customers, distributors, end-users, vendors including customer-support and/or manufacturers the normal operation of the Accused Products that infringe the '067 Patent. Non-limiting examples of such are found above in the various screenshots that instruct performance of the infringing use of the technology. Apple is aware and/or willfully blind that these affirmative acts infringe and/or would induce infringement of the '067 Patent, of which it had knowledge.

67. Apple is also liable under 35 U.S.C. § 271(c) for contributing to and continuing to contribute to the infringement of the '067 Patent by, among other things, providing a system for capturing image and audio information for storage in its Accused Products and by encouraging, at a minimum, customers, distributors, end-users, vendors including customer-support and/or manufacturers in this District and elsewhere, to infringe the '067 Patent. By importing, exporting, manufacturing, distributing, selling, and/or providing the Accused Products and/or Services for their intended use to customers, distributors, end-users, vendors including customer-support and/or manufacturers, Apple has infringed one or more claims of the '067 Patent. The infringing functionality in the Accused Products is material to the inventions claimed in the '067 Patent, has no substantial non-infringing uses, and is known to Apple (on information and belief) to be especially made or adapted for use in infringing the '067 Patent, and which is otherwise not staple articles of commerce suitable for substantial non-infringing use. There are no non-infringing uses for the infringing functionality in the Accused Products other than to create searchable tags as associated metadata for image and/or audio files. Apple is aware and/or willfully blind that these affirmative acts infringe and/or constitute contributory infringement of the '067 Patent, of which it had knowledge.

68. Apple is liable for indirect infringement, i.e., both inducement and contributory infringement, based on the direct infringement that is the result of activities performed by customers, distributors, end-users, vendors including customer-support and/or manufacturers who use all elements or perform all steps of one or more claims of the '067 Patent. For example, end users of Apple's Accused Products infringe, either directly or under the doctrine of equivalents, one or more claims of the '067 Patent (*e.g.*, claim 6 and one or more of its dependents). At a

minimum, Apple is liable for the indirect infringement of claim 6 and one or more of its dependents of the ’067 Patent.

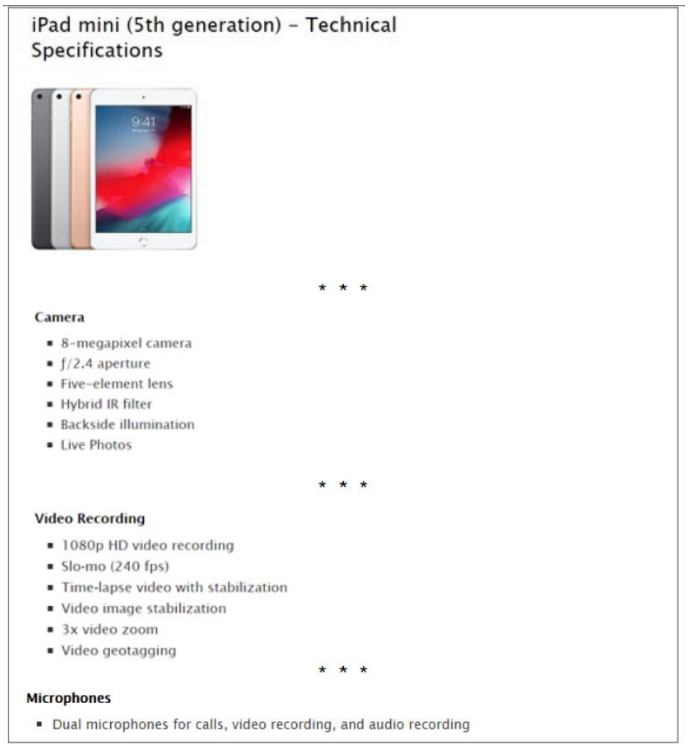
69. MyPort has been damaged because of Apple’s infringing conduct. Apple is, thus, liable to MyPort in an amount that adequately compensates MyPort for Apple’s infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT III: INFRINGEMENT OF U.S. PATENT NO. 10,721,066

70. MyPort reasserts and incorporates herein by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

71. Apple has infringed at least claim 13 and one or more of its dependents of the ’066 Patent under 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering for sale in the United States, and/or importing into the United States, the Accused Products.

72. As just one non-limiting example, set forth below with claim language in italics is a description of infringement of exemplary claim 13 of the ’066 Patent (MyPort reserves the right to modify this description, including on the basis of information it obtains during discovery): *a method for capturing image and audio information for storage, comprising*: To the extent the preamble is limiting, the Accused Products, such as the iPad Mini 5, performs a method for capturing image information via a camera and a microphone capable of capturing audio information, and memory capable of storing this information.



iPad mini (5th generation) – Technical Specifications

* * *

Camera

- 8-megapixel camera
- ƒ/2.4 aperture
- Five-element lens
- Hybrid IR filter
- Backside illumination
- Live Photos

* * *

Video Recording

- 1080p HD video recording
- Slo-mo (240 fps)
- Time-lapse video with stabilization
- Video image stabilization
- 3x video zoom
- Video geotagging

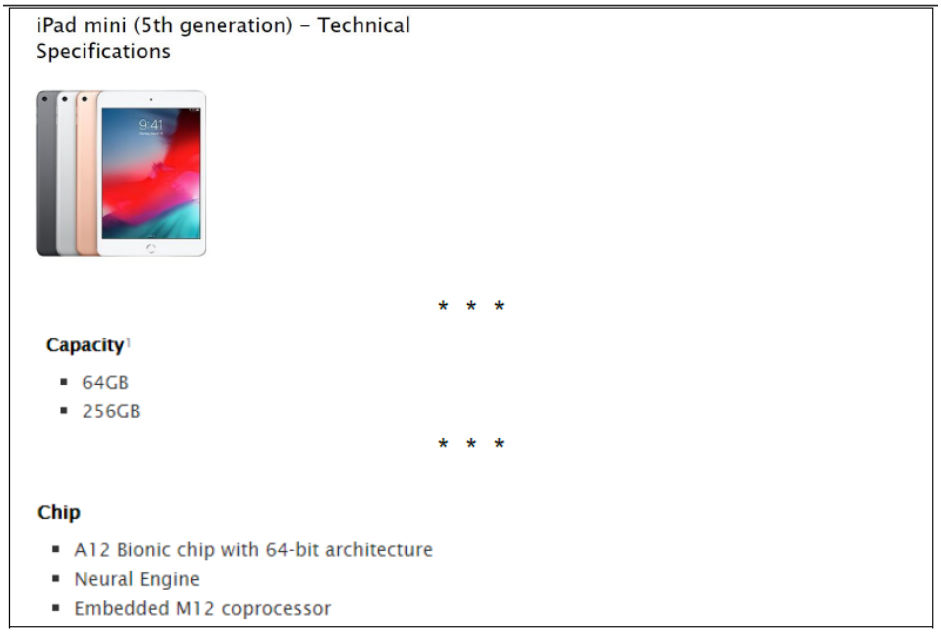
* * *

Microphones

- Dual microphones for calls, video recording, and audio recording

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

73. The Accused Products include *internal storage*. The Accused Products, such as the iPad Mini 5, provide flash memory, cache memory, and RAM to store information.



iPad mini (5th generation) – Technical Specifications

* * *

Capacity[1]

- 64GB
- 256GB

* * *

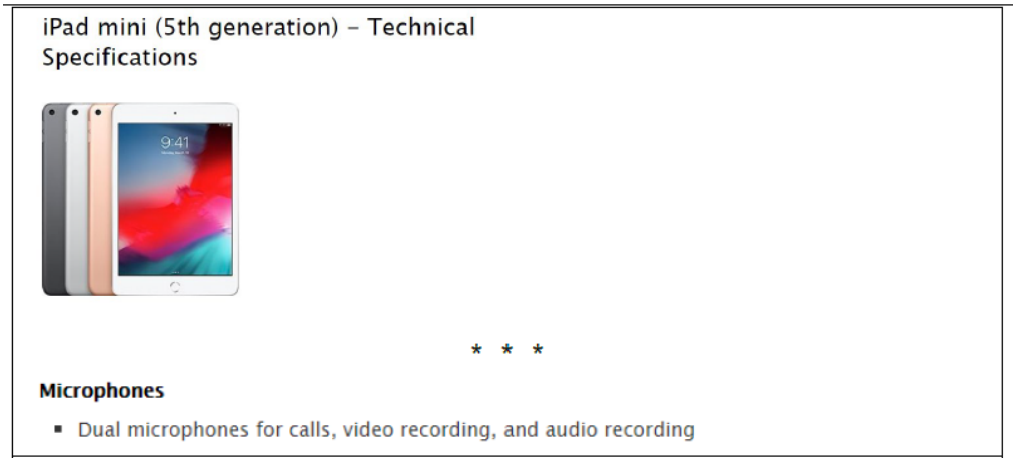
Chip

- A12 Bionic chip with 64-bit architecture
- Neural Engine
- Embedded M12 coprocessor

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).

74. The Accused Products include *interfacing a microphone with an external audio information source that generates external audio information.* The Accused Products, such as the iPad Mini 5, contain a microphone capable of recording audio information from an external audio information source. For example, the microphone can record the words of a user who dictates into the microphone.



Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).

75. The Accused Products include *converting with a first data converter the external audio information from the microphone*. The Accused Products, such as the iPad Mini 5, uses the device processor and software to capture the external audio information from the microphone.

Dictate text on iPhone

With Dictation on iPhone, you can dictate text anywhere you can type it. You can also use typing and Dictation together—the keyboard stays open during Dictation so you can easily switch between voice and touch to enter text.

Dictation requests are processed on your device in many languages—no internet connection is required. When dictating in a search box, dictated text may be sent to the search provider in order to process the search.

Note: Dictation may not be available in all languages or in all countries or regions, and features may vary. See the iOS and iPadOS Feature Availability website.

When using Dictation, cellular data charges may apply. See View or change cellular data settings.

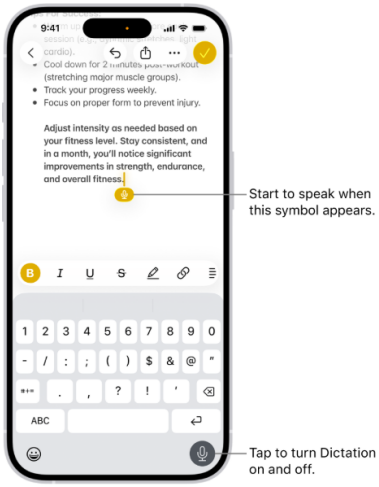
Turn on Dictation

1. Go to the Settings app on your iPhone.
2. Tap General, then tap Keyboard.
3. Turn on Enable Dictation. If a prompt appears, tap Enable Dictation.

To learn more about how Apple protects your information and lets you choose what you share, tap About Dictation & Privacy below Dictation, or see the Apple Privacy website.

Dictate text

Dictate text and use voice commands to edit and format content.



Source: support.apple.com/en-us/HT208343 (last accessed Oct. 9, 2025).

76. The Accused Products include *interfacing a camera with an image source to capture an image therefrom.* The camera of the Accused Products, such as the iPad Mini 5, interfaces with an image source. It senses the image and converts it to a series of quantized pixels that, in aggregate, make up the image.

iPad mini (5th generation) – Technical Specifications

* * *

Camera

- 8-megapixel camera
- ƒ/2.4 aperture
- Five-element lens
- Hybrid IR filter
- Backside illumination
- Live Photos

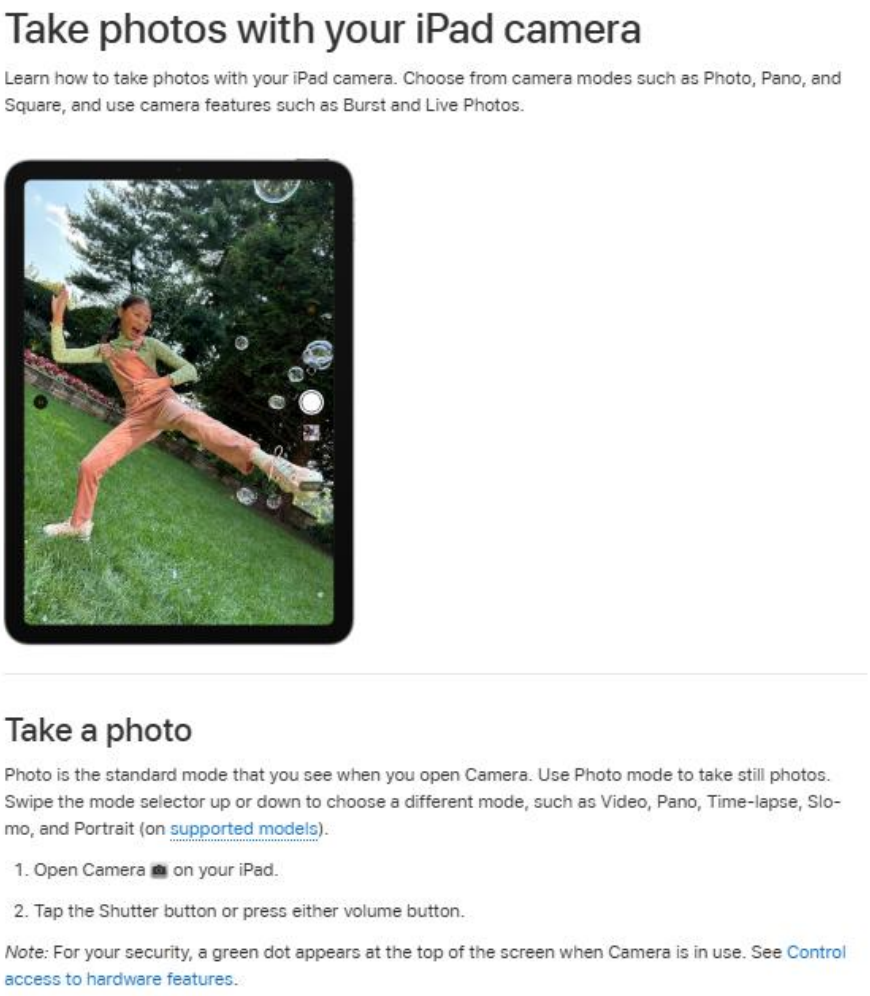
* * *

Video Recording

- 1080p HD video recording
- Slo-mo (240 fps)
- Time-lapse video with stabilization
- Video image stabilization
- 3x video zoom
- Video geotagging

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

Source: www.ifixit.com/Teardown/iPad+Mini+5+Teardown/121589 (last accessed Oct. 9, 2025).



Take photos with your iPad camera

Learn how to take photos with your iPad camera. Choose from camera modes such as Photo, Pano, and Square, and use camera features such as Burst and Live Photos.

Take a photo

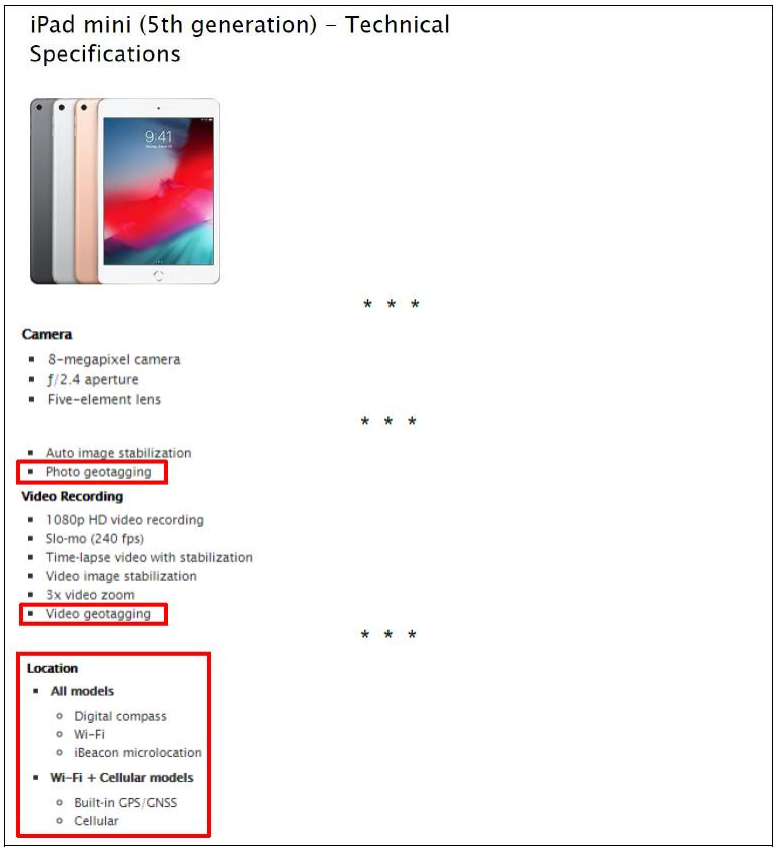
Photo is the standard mode that you see when you open Camera. Use Photo mode to take still photos. Swipe the mode selector up or down to choose a different mode, such as Video, Pano, Time-lapse, Slo-mo, and Portrait (on supported models).

1. Open Camera on your iPad.
2. Tap the Shutter button or press either volume button.

Note: For your security, a green dot appears at the top of the screen when Camera is in use. See Control access to hardware features.

Source: support.apple.com/guide/ipad/take-photos-ipad99b53a71//18.0/ipados (last accessed Oct. 9, 2025).

77. The Accused Products include *capturing within a capture device, as captured data, location information and time information associated with at least the capture of the image and storing the captured data as stored captured data.* The Accused Products include location settings that allow the mobile device to determine location and time information of a captured image.



iPad mini (5th generation) – Technical Specifications

* * *

Camera

- 8-megapixel camera
- ƒ/2.4 aperture
- Five-element lens

* * *

- Auto image stabilization
- Photo geotagging

Video Recording

- 1080p HD video recording
- Slo-mo (240 fps)
- Time-lapse video with stabilization
- Video image stabilization
- 3x video zoom
- Video geotagging

* * *

Location

- **All models**
  - Digital compass
  - Wi-Fi
  - iBeacon microlocation
- **Wi-Fi + Cellular models**
  - Built-in GPS/GNSS
  - Cellular

Source: https://support.apple.com/en-us/111904 (last accessed Oct. 9, 2025).

78. The Accused Products include *the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio within the capture device, the camera for processing the captured image and storing it as a stored digital image.* Each Accused Product includes a first data converter (e.g., relevant portions of the processor and associated software) that processes the user's words dictated into the microphone (i.e., the captured external audio information) to convert the external audio information into digital audio data and further stores it as digital audio in the device's memory. Each Accused Product has a camera (including the use of relevant portions of the processor and associated software) that processes images and stores the images as a digital file.

79. Each Accused Product has a camera (including the use of relevant portions of the processor and associated software) that processes images and stores the images as a digital file.

Add or edit titles, captions and more in Photos on iCloud.com

In Photos on iCloud.com, you can view and edit metadata about a photo or video, such as the date, time and location. You can also add titles and captions to make it easier to search for items.

1. Go to icloud.com/photos, then sign in to your Apple Account (if necessary).
2. Tap or double-click the photo or video you want to see more information about.
3. Select ⓘ.
4. Select Edit next to any of the following metadata:
   - *Title and caption:* Enter text in the field.
   - *Date and time:* Select anything in the Adjusted field, then specify the new date or time. To discard any changes, select Revert to Original.
   - *Location:* Enter a location in the field, then choose an option. To remove the location, select Remove Location.

     Tip: If the photo or video doesn't have a location already, select Add Location first.
5. Select Save.

   The title appears in the Photos toolbar when you view a photo. You can also see it from the thumbnail view.

If you add or edit a caption for a photo or video in your iCloud Shared Photo Library, all participants can see the changes.

Source: https://support.apple.com/en-au/guide/icloud/mm54e2d3fb7a/icloud#:~:text=You%20can%20view%20metadata%20about,Apple%20Account%20(if%20necessary) (last accessed Oct. 9, 2025).

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Dictation requests are processed on your device in many languages—no internet connection is required. When dictating in a search box, dictated text may be sent to the search provider in order to process the search.

Note: Dictation may not be available in all languages or in all countries or regions, and features may vary. See the iOS and iPadOS Feature Availability website.

When using Dictation, cellular data charges may apply. See View or change cellular data settings.

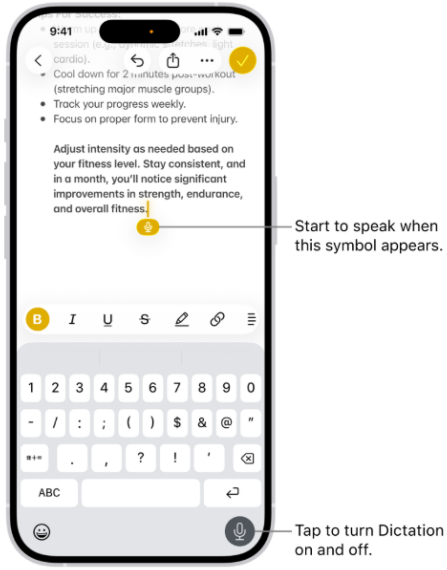
Turn on Dictation

1. Go to the Settings app on your iPhone.
2. Tap General, then tap Keyboard.
3. Turn on Enable Dictation. If a prompt appears, tap Enable Dictation.

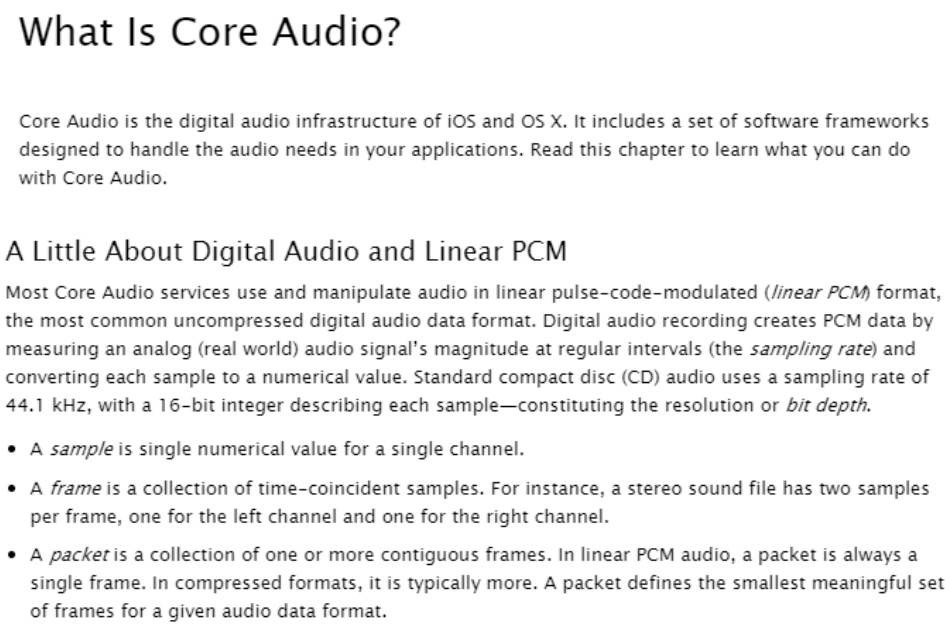
To learn more about how Apple protects your information and lets you choose what you share, tap About Dictation & Privacy below Dictation, or see the Apple Privacy website.

Dictate text

Dictate text and use voice commands to edit and format content.



Source: support.apple.com/en-us/HT208343 (last accessed Oct. 9, 2025).



What Is Core Audio?

Core Audio is the digital audio infrastructure of iOS and OS X. It includes a set of software frameworks designed to handle the audio needs in your applications. Read this chapter to learn what you can do with Core Audio.

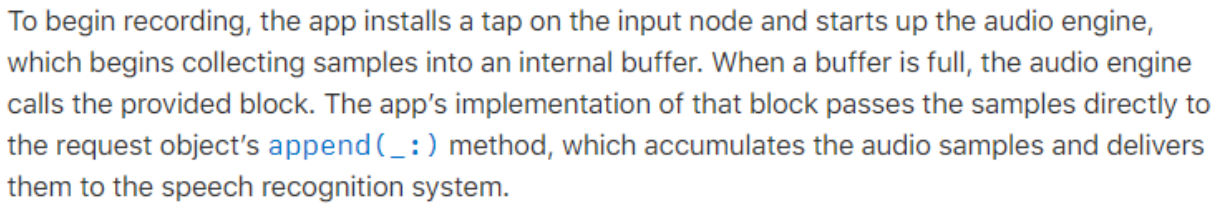
A Little About Digital Audio and Linear PCM

Most Core Audio services use and manipulate audio in linear pulse-code-modulated (*linear PCM*) format, the most common uncompressed digital audio data format. Digital audio recording creates PCM data by measuring an analog (real world) audio signal's magnitude at regular intervals (the *sampling rate*) and converting each sample to a numerical value. Standard compact disc (CD) audio uses a sampling rate of 44.1 kHz, with a 16-bit integer describing each sample—constituting the resolution or *bit depth*.

- A *sample* is single numerical value for a single channel.
- A *frame* is a collection of time-coincident samples. For instance, a stereo sound file has two samples per frame, one for the left channel and one for the right channel.
- A *packet* is a collection of one or more contiguous frames. In linear PCM audio, a packet is always a single frame. In compressed formats, it is typically more. A packet defines the smallest meaningful set of frames for a given audio data format.

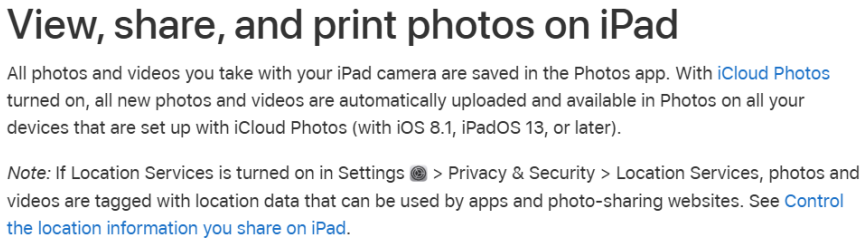
Source:

developer.apple.com/library/archive/documentation/MusicAudio/Conceptual/CoreAudioOverview/WhatisCoreAudio/WhatisCoreAudio.html#//apple_ref/doc/uid/TP40003577-CH3-SW1 (last accessed Oct. 9, 2025).



To begin recording, the app installs a tap on the input node and starts up the audio engine, which begins collecting samples into an internal buffer. When a buffer is full, the audio engine calls the provided block. The app's implementation of that block passes the samples directly to the request object's `append(_:)` method, which accumulates the audio samples and delivers them to the speech recognition system.

Source: developer.apple.com/documentation/speech/recognizing_speech_in_live_audio.

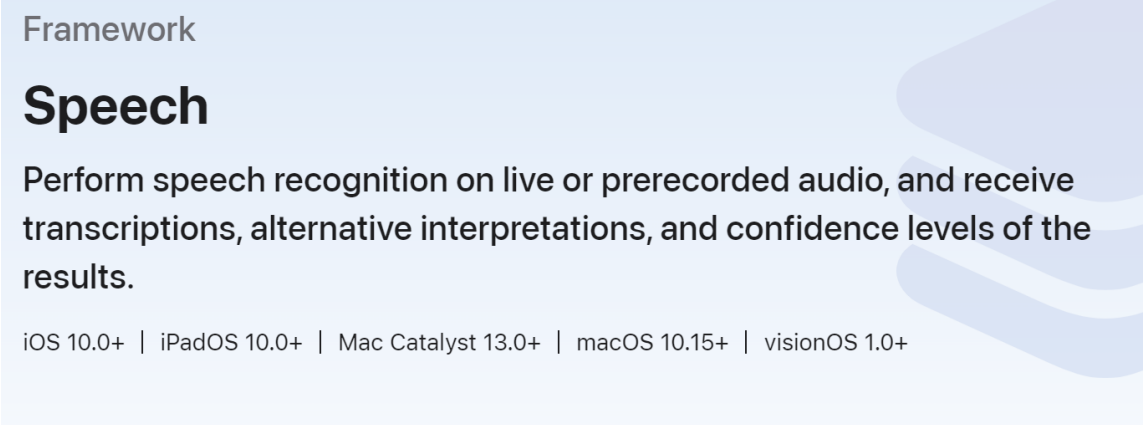


View, share, and print photos on iPad

All photos and videos you take with your iPad camera are saved in the Photos app. With iCloud Photos turned on, all new photos and videos are automatically uploaded and available in Photos on all your devices that are set up with iCloud Photos (with iOS 8.1, iPadOS 13, or later).

Note: If Location Services is turned on in Settings > Privacy & Security > Location Services, photos and videos are tagged with location data that can be used by apps and photo-sharing websites. See Control the location information you share on iPad.

Source: support.apple.com/guide/ipad/view-share-and-print-photos-ipad99b53b6d/ipados/18.0 (last accessed Oct. 9, 2025).



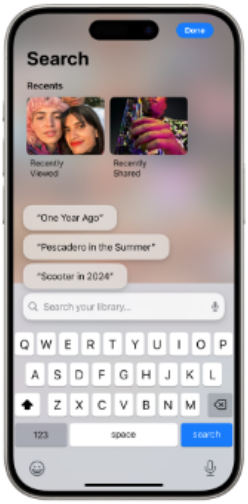
Source: developer.apple.com/documentation/speech (last accessed Oct. 9, 2025).

80. The Accused Products include *converting with a second data converter the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image and with the stored captured data.* When the Accused Products capture spoken audio, the Accused Products can perform speech recognition. The speech recognition converts the digital audio into text in the image's tag field. The Accused Products also use machine learning (or image recognition) to automatically apply image recognition tags to photos stored on the device.

Search for photos and videos on iPhone

When you tap Search in the Photos app, you see suggestions of dates, people, and locations to help you find what you're looking for.

Tap the suggestions or type keywords into the search field—for example, a person's name, date, location, or object—to help you find a specific photo.



Search for photos and videos

1. Go to the Photos app on your iPhone.
2. Tap Search, then search by any of the following:

- Date (month or year)
- Place (city or state)
- Business names (museums, for example)
- Category (beach or sunset, for example)
- Events (sports games or concerts, for example)
- A person identified in People & Pets (see Find and name people and pets)
- Text (an email address or phone number, for example)
- Caption (see See photo and video information)

Tip: Looking for something more specific? Refine your search with multiple keywords—keep adding keywords until you find the right photo. Search also suggests keywords to add to your search.

Source: https://support.apple.com/guide/iphone/search-for-photos-and-videos-iph392d77d5f/18.0/ios/18.0 (last accessed Oct. 9, 2025)

See also Apple Photos.

81. As shown above, the Accused Products include *storing in the internal storage the digital image in association with the text and image recognition context tags in addition to the stored captured data*. The Accused Products, such as the iPad Mini 5, provide flash memory, cache memory, and RAM to store information.

82. Apple has committed acts of infringement without license or authorization. Apple knew or should have known that its actions would cause direct and indirect infringement of the '066 Patent. On information and belief, Apple acted with objective recklessness by proceeding despite an objective high likelihood that its actions constituted infringement of a valid patent, where such action constitutes egregious misconduct and willful infringement.

83. In the event Apple itself does not perform the entire process, the infringement of the '066 Patent is attributable to Apple because Apple directs and controls the users of the Accused Products to perform acts that result in infringement, and Apple receives benefit from its infringement.

84. Apple is also liable under 35 U.S.C. § 271(b) for actively inducing infringement and continuing to actively induce infringement. Apple actively induced its customers, distributors, end-users, vendors including customer-support and/or manufacturers to infringe the '066 Patent. On information and belief, Apple possessed a specific intent to induce infringement, and in fact did induce infringement, by engaging in affirmative acts such as by selling and causing the Accused Products to be manufactured, by providing user guides, installation or instruction manuals, and other training materials, by advertising and solicitation and otherwise providing sales-related materials, and by instructing and/or demonstrating to customers, distributors, end-users, vendors including customer-support and/or manufacturers the normal operation of the Accused Products that infringe the '066 Patent. Non-limiting examples of such are found above

in the various screenshots that instruct performance of the infringing use of the technology. Apple is aware and/or willfully blind that these affirmative acts infringe and/or would induce infringement of the '066 Patent, of which it had knowledge.

85. Apple is also liable under 35 U.S.C. § 271(c) for contributing to and continuing to contribute to the infringement of the '066 Patent by, among other things, providing a system for capturing image and audio information for storage in its Accused Products and by encouraging, at a minimum, customers, distributors, end-users, vendors including customer-support and/or manufacturers in this District and elsewhere, to infringe the '066 Patent. By importing, exporting, manufacturing, distributing, selling, and/or providing the Accused Products and/or Services for their intended use to customers, distributors, end-users, vendors including customer-support and/or manufacturers, Apple has infringed one or more claims of the '066 Patent. The infringing functionality in the Accused Products is material to the inventions claimed in the '066 Patent, has no substantial non-infringing uses, and is known to Apple (on information and belief) to be especially made or adapted for use in infringing the '066 Patent, and which is otherwise not staple articles of commerce suitable for substantial non-infringing use. There are no non-infringing uses for the infringing functionality in the Accused Products other than to create searchable tags as associated metadata for image and/or audio files. Apple is aware and/or willfully blind that these affirmative acts infringe and/or constitute contributory infringement of the '066 Patent, of which it had knowledge.

86. Apple is liable for indirect infringement, i.e., both inducement and contributory infringement, based on the direct infringement that is the result of activities performed by customers, distributors, end-users, vendors including customer-support and/or manufacturers who use all elements or perform all steps of one or more claims of the '066 Patent. For example, end

users of Apple's Accused Products infringe, either directly or under the doctrine of equivalents, one or more claims of the '066 Patent (e.g., claim 13 and one or more of its dependents). At a minimum, Apple is liable for the indirect infringement of claim 13 and one or more of its dependents of the '066 Patent.

87. MyPort has been damaged because of Apple's infringing conduct. Apple is, thus, liable to MyPort in an amount that adequately compensates MyPort for Apple's infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

DEMAND FOR JURY TRIAL

MyPort demands a trial by jury on all claims and issues triable of right by jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff respectfully requests the following relief:

a) A judgment in favor of MyPort that Apple has infringed, either literally and/or under the doctrine of equivalents, the Patents-in-Suit;

b) An award of damages adequate to compensate MyPort for Apple's infringement of the Patents-in-Suit, and in no event less than a reasonable royalty for Apple's acts of infringement, including all pre-judgment and post-judgment interest at the maximum rate permitted by law;

c) An award of trebled damages due to Apple's willful infringement, and any other enhanced damages under 35 U.S.C. § 284;

d) A declaration that this case is exceptional under 35 U.S.C. § 285;

e) An award of MyPort's costs and attorney's fees under 35 U.S.C. § 285 and other applicable law; and

f) Any other remedy to which MyPort may be entitled.

Dated: October 10, 2025

Respectfully submitted,

STAMOULIS & WEINBLATT LLC

/s/ Stamatios Stamoulis

Stamatios Stamoulis (#4606)
Richard C. Weinblatt (#5080)
STAMOULIS & WEINBLATT LLC
800 N. West St., 3rd Floor
Wilmington, DE 19801
Telephone: (302) 999-1540
stamoulis@swdelaw.com
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EXHIBIT A

US009832017B2

(12) **United States Patent**
Malone

(10) **Patent No.: US 9,832,017 B2**
(45) **Date of Patent: *Nov. 28, 2017**

(54) **APPARATUS FOR PERSONAL VOICE ASSISTANT, LOCATION SERVICES, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAG(S)/ CONTEXTUAL TAG(S), STORAGE AND SEARCH RETRIEVAL**

(71) Applicant: **MYPORT TECHNOLOGIES, INC.**, McKinney, TX (US)

(72) Inventor: **Michael F. Malone**, McKinney, TX (US)

(73) Assignee: **MYPORT IP, INC.**, McKinney, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **15/272,013**

(22) Filed: **Sep. 21, 2016**

(65) **Prior Publication Data**

US 2017/0011106 A1 Jan. 12, 2017

Related U.S. Application Data

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H04L 9/14 (2006.01)
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(Continued)

(52) **U.S. Cl.**
CPC ***H04L 9/14*** (2013.01); ***G06F 17/3028*** (2013.01); ***G06F 17/30038*** (2013.01);
(Continued)

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See application file for complete search history.

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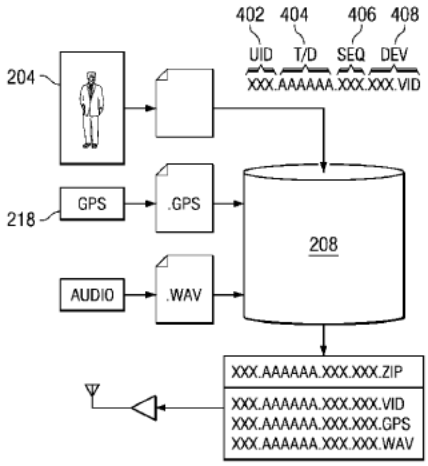
(57) **ABSTRACT**

This invention relates to a network interface device. A first capture device interfaces with a first external information source to capture first external information. A processor processes the captured first external information and stores it in a first media. The processor initiates the storage of the first captured information at an initial time and completes storage of the first captured information at a completion time, thus providing a stored defined set of first captured information. A transmitter transmits the defined set of stored captured information to a remote location on a network. A remote processing system is disposed at the remote node on
(Continued)



the network and includes a database and a receiver for receiving the transmitted defined set of first captured information. A data converter is operable to convert the received defined set of first captured information to a second format. The database stores the set of converted captured information.

17 Claims, 4 Drawing Sheets

Related U.S. Application Data

continuation of application No. 13/965,625, filed on Aug. 13, 2013, now Pat. No. 8,983,119, which is a continuation of application No. 13/417,229, filed on Mar. 10, 2012, now Pat. No. 8,509,477, which is a continuation of application No. 12/857,358, filed on Aug. 16, 2010, now Pat. No. 8,135,169, which is a continuation of application No. 11/621,062, filed on Jan. 8, 2007, now Pat. No. 7,778,438, and a continuation-in-part of application No. 11/325,373, filed on Jan. 4, 2006, now Pat. No. 7,184,573, which is a continuation of application No. 10/674,910, filed on Sep. 29, 2003, now Pat. No. 6,996,251.

(60) Provisional application No. 60/757,075, filed on Jan. 6, 2006, provisional application No. 60/414,449, filed on Sep. 30, 2002.

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H04N 5/76	(2006.01)
H04N 5/44	(2011.01)
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H04N 21/2747	(2011.01)
H04N 21/41	(2011.01)
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H04N 21/835	(2011.01)
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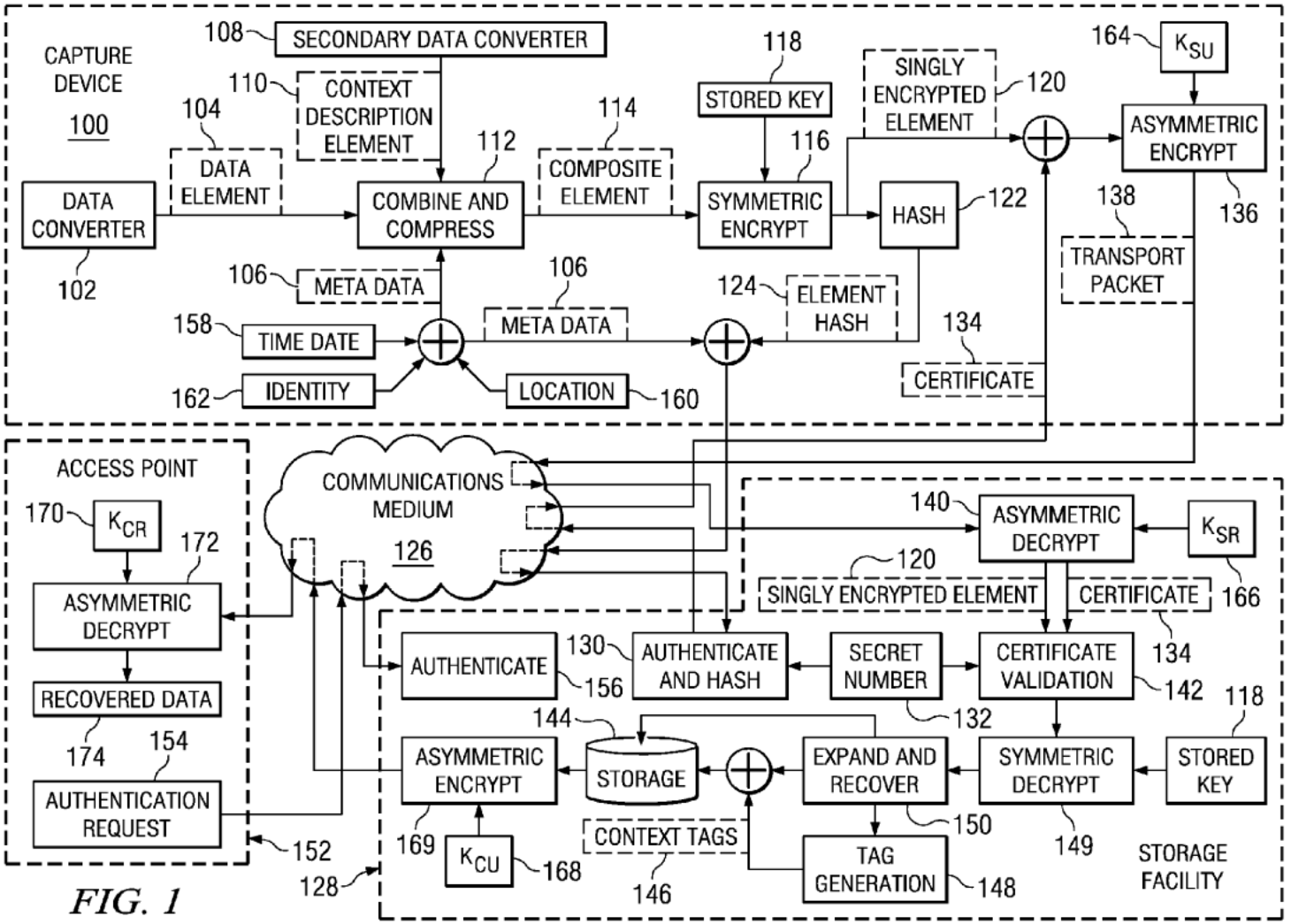

CAPTURE DEVICE
100
DATA CONVERTER
102
DATA ELEMENT
104
CONTEXT DESCRIPTION ELEMENT
110
SECONDARY DATA CONVERTER
108
COMBINE AND COMPRESS
112
COMPOSITE ELEMENT
114
STORED KEY
118
SYMMETRIC ENCRYPT
116
SINGLY ENCRYPTED ELEMENT
120
HASH
122
ASYMMETRIC ENCRYPT
136
K_{SU}
164
TRANSPORT PACKET
138
META DATA
106
META DATA
106
TIME DATE
158
IDENTITY
162
LOCATION
160
ELEMENT HASH
124
CERTIFICATE
134
ACCESS POINT
COMMUNICATIONS MEDIUM
126
K_{CR}
170
ASYMMETRIC DECRYPT
172
RECOVERED DATA
174
AUTHENTICATION REQUEST
154
152
128
ASYMMETRIC DECRYPT
140
K_{SR}
166
SINGLY ENCRYPTED ELEMENT
120
CERTIFICATE
134
AUTHENTICATE
156
AUTHENTICATE AND HASH
130
SECRET NUMBER
132
CERTIFICATE VALIDATION
142
STORED KEY
118
ASYMMETRIC ENCRYPT
STORAGE
144
EXPAND AND RECOVER
SYMMETRIC DECRYPT
149
150
K_{CU}
169
168
CONTEXT TAGS
146
TAG GENERATION
148
STORAGE FACILITY

FIG. 1

FIG. 2

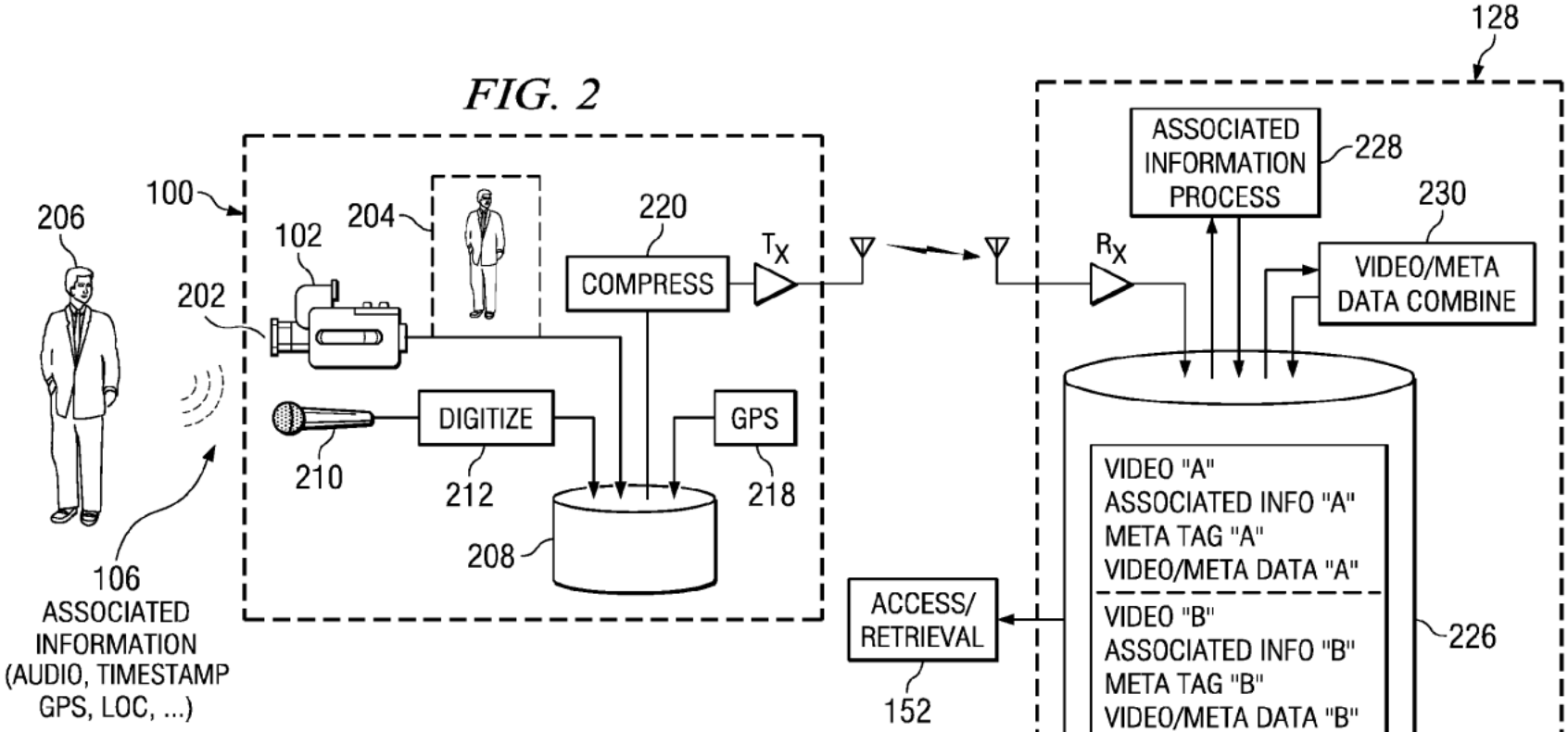
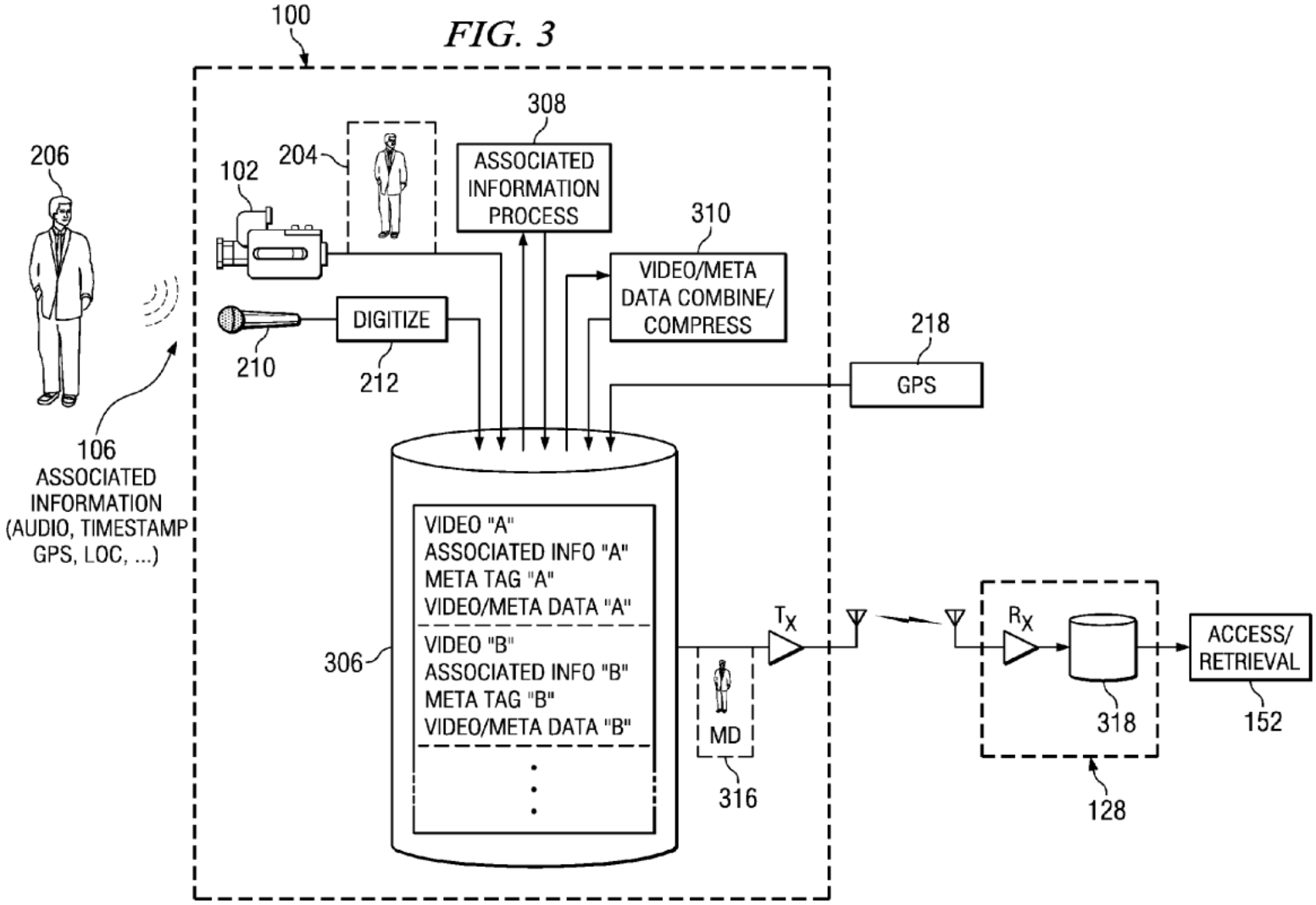

128
100
206
102
204
220
202
COMPRESS
Tx
Rx
ASSOCIATED INFORMATION PROCESS
228
230
VIDEO/META DATA COMBINE
DIGITIZE
GPS
210
212
218
208
106
ASSOCIATED INFORMATION (AUDIO, TIMESTAMP GPS, LOC, ...)
ACCESS/ RETRIEVAL
152
VIDEO "A"
ASSOCIATED INFO "A"
META TAG "A"
VIDEO/META DATA "A"
VIDEO "B"
ASSOCIATED INFO "B"
META TAG "B"
VIDEO/META DATA "B"
226

FIG. 3


100
206
102
204
308
ASSOCIATED INFORMATION PROCESS
310
VIDEO/META DATA COMBINE/ COMPRESS
DIGITIZE
210
212
218
GPS
106
ASSOCIATED INFORMATION (AUDIO, TIMESTAMP GPS, LOC, ...)
VIDEO "A"
ASSOCIATED INFO "A"
META TAG "A"
VIDEO/META DATA "A"
VIDEO "B"
ASSOCIATED INFO "B"
META TAG "B"
VIDEO/META DATA "B"
306
MD
316
Tx
Rx
318
128
ACCESS/ RETRIEVAL
152

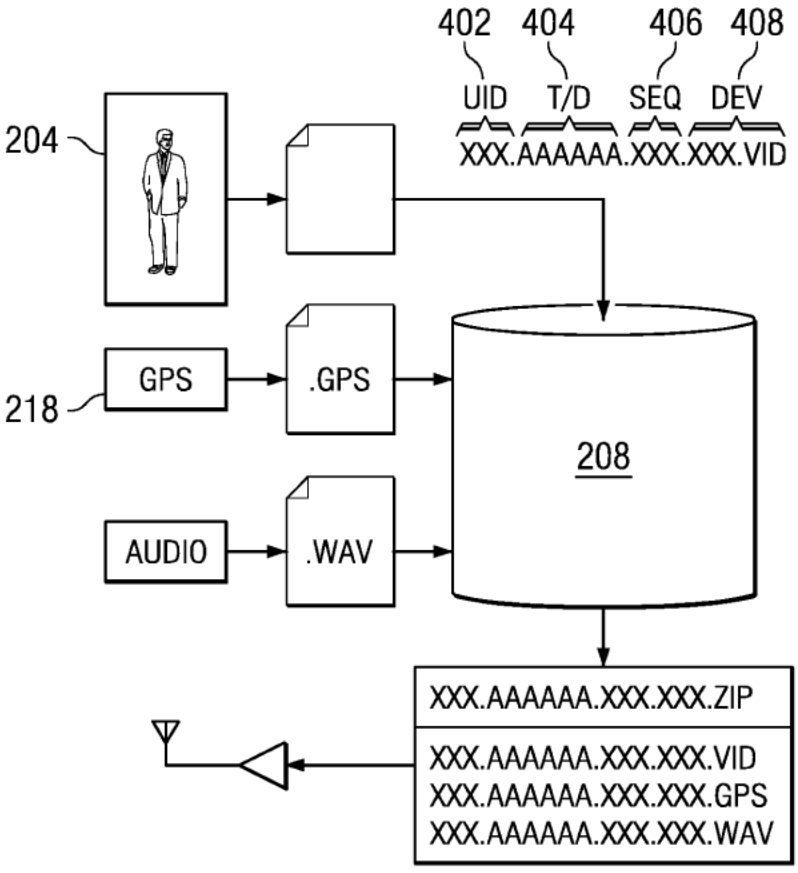

402
404
406
408
UID
T/D
SEQ
DEV
XXX.AAAAAA.XXX.XXX.VID
204
GPS
.GPS
218
208
AUDIO
.WAV
XXX.AAAAAA.XXX.XXX.ZIP
XXX.AAAAAA.XXX.XXX.VID
XXX.AAAAAA.XXX.XXX.GPS
XXX.AAAAAA.XXX.XXX.WAV

FIG. 4

APPARATUS FOR PERSONAL VOICE ASSISTANT, LOCATION SERVICES, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAG(S)/ CONTEXTUAL TAG(S), STORAGE AND SEARCH RETRIEVAL

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a Continuation of U.S. patent application Ser. No. 14/660,166, filed Mar. 17, 2015, and entitled METHOD FOR PERSONAL VOICE ASSISTANT, LOCATION SERVICES, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, which is a Continuation of U.S. patent application Ser. No. 13/965,625, filed Aug. 13, 2013, and entitled METHOD FOR VOICE COMMAND ACTIVATION, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 8,983,119, issued on Mar. 17, 2015. U.S. patent application Ser. No. 13/965,625 is a Continuation of U.S. patent application Ser. No. 13/417,229, filed on Mar. 10, 2012, and entitled METHOD FOR MULTI-MEDIA CAPTURE, TRANSMISSION, CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 8,509,477, issued on Aug. 13, 2013, the specifications of which are incorporated herein by reference.

U.S. patent application Ser. No. 13/417,229 is a Continuation of U.S. patent application Ser. No. 12/857,358, filed on Aug. 16, 2010, and entitled METHOD FOR MULTI-MEDIA CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, published as U.S. Patent Application Publication No. US 2010/0303288, now U.S. Pat. No. 8,135,169, issued on Mar. 13, 2012. U.S. Patent Application Publication No. 2010/0303288 and U.S. Pat. No. 8,135,169 are incorporated by reference herein.

U.S. patent application Ser. No. 12/857,358 is a Continuation of U.S. patent application Ser. No. 11/621,062, filed on Jan. 8, 2007, and entitled METHOD FOR MULTI-MEDIA RECOGNITION, DATA CONVERSION, CREATION OF METATAGS, STORAGE AND SEARCH RETRIEVAL, published as U.S. Patent Application Publication No. US 2007/0150517, now U.S. Pat. No. 7,778,438, issued on Aug. 17, 2010. U.S. Patent Application Publication No. U.S. 2007/0150517 and U.S. Pat. No. 7,778,438 are incorporated by reference herein.

U.S. patent application Ser. No. 11/621,062 is a Continuation-in-Part of U.S. patent application Ser. No. 11/325,373, filed Jan. 4, 2006, and entitled APPARATUS FOR CAPTURING INFORMATION AS A FILE AND ENHANCING THE FILE WITH EMBEDDED INFORMATION, published as U.S. Patent Application Publication No. US 2006/0115111, now U.S. Pat. No. 7,184,573, issued on Feb. 27, 2007. Application Ser. No. 11/621,062 claims benefit of U.S. Provisional Application No. 60/757,075, filed on Jan. 6, 2006, and entitled APPARATUS AND METHOD FOR EMBEDDING META-TAGS INTO MEDIA FILES. U.S. Patent Application Publication No. US 2006/0115111 and U.S. Pat. No. 7,184,573 are incorporated by reference herein.

U.S. patent application Ser. No. 11/325,373 is a Continuation of U.S. patent application Ser. No. 10/674,910, filed Sep. 29, 2003, and entitled FORENSIC COMMUNICATION APPARATUS AND METHOD, published as U.S. Patent Application Publication No. US 2004/0125208, now U.S. Pat. No. 6,996,251, issued on Feb. 7, 2006. Application Ser. No. 10/674,910 claims benefit of U.S. Provisional Application No. 60/414,449, filed Sep. 30, 2002, and entitled FORENSIC COMMUNICATION APPARATUS AND METHOD. U.S. Patent Application Publication No. US 2004/0125208 and U.S. Pat. No. 6,996,251 and U.S. Pat. No. 6,996,251 are incorporated by reference herein.

TECHNICAL FIELD

This invention relates to the storage and search retrieval of all types of digital media files, whether music or other audio, still photographs, videos, movies or other types of media.

BACKGROUND

The popularity of digital media devices such as digital cameras, video cameras, mobile phones with audio and video recording capability and portable music devices that have recording capability has exploded in recent years. Instead of recording pictures, video and sound on physical media, modern devices record to rewritable memory devices. This means that the cost to create a new image, movie or audio recording has fallen to near zero, making the number of these recordings available in any given individual's library skyrocket.

But this new ability to store virtually unlimited numbers of media files introduces new problems. First, the sheer number makes it nearly impossible to manually describe and index every media file in one's possession. This means that, for many, photographs, movies and audio recordings are kept in poorly organized computer files and finding any particular picture, movie or recording is a difficult and time-consuming process.

The second problem is the fact that people typically trade up to a new computer every three years or so. This means that hours of video, thousands of pictures or hundreds of audio files must be transferred from the old system to the new—a sometimes daunting task.

A third problem is one can typically access locally stored media files only on the computer on which they reside. If one wishes to share the file with another one must typically employ some file-transfer method ahead of time (email, FTP, public server, etc.)

A fourth problem relates to e-mailing or sending your media files to another party, whereas the receiving party is not able to search the media files for the specific key indexes that the original owner had intended. While there are programs to allow the originator to type in key index words (tags) for searching and retrieving these media files from their personal computer, when these media files are e-mailed or sent to another party, these tags are removed from the media file, therefore the receiving party does not have an ability to search, sort, display, play or print these media files based on the original owners key indexes.

Finally, those who make a living providing content need some method for proving that a given work belongs to them, and that they are the original creator of the work.

SUMMARY

The present invention disclosed and claimed in one aspect thereof a system for capturing data in a first media and

storing in a database at a remote location on a network. A network interface device is provided having a first capture device interfacing with a first external information source that generates external information and capturing the first external information during generation thereof. A processor is provided for processing the captured first external information and storing it in a first media format as stored first captured information within the network interface device, the processor initiating the storage of the first captured information as stored first captured information at an initial time and completes storage of the first captured information as stored first captured information at a completion time, thus providing a stored defined set of first captured information representing the first captured information between the initial time and the completion time. A transmitter is provided for transmitting as a transmitted defined set of first captured information the defined set of stored captured information to a remote location on a network after the completion time. A remote processing system is disposed at the remote node on the network and includes a database and a receiver for receiving the transmitted defined set of first captured information from the transmitter associated with the network interface device as a received defined set of first captured information. A data converter is operable to convert the received defined set of first captured information to a second format as a set of converted first captured information, the second format different than the first media format, the second format being a searchable format. The database then stores the set of converted captured information.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following description taken in conjunction with the accompanying Drawings in which:

FIG. **1** illustrates a block diagram of the overall operation of the system in accordance with the present disclosure.

FIG. **2** illustrates a block diagram of one embodiment of the overall operation of the system in accordance with the present disclosure.

FIG. **3** illustrates a block diagram of another embodiment of the overall operation of the system in accordance with the present disclosure.

FIG. **4** illustrates a block diagram of the file management of the system in accordance with the present disclosure.

DETAILED DESCRIPTION

Referring now to FIG. **1**, there is illustrated a block diagram of the overall operation of the system in accordance with the present disclosure. The invention is best described by beginning with the capture device **100**.

Still pictures, moving pictures, audio, telemetry or other information (hereafter called simply, "information") is gathered by the data converter **102** and organized into one "data element" **104** consisting of a single picture, a movie/video clip, an audio clip, a sample of telemetry data or other logical grouping of related information. The data converter **102** can be any type of data capture information. For pictures, a digital camera can be utilized and, for movie/video clips, the data converter can be a digital video recorder (DVR). In general, the data converter is any type of device that will capture the information and place it in some type of digitized format. As will be understood and discussed herein below, this digitized format is typically native to the data converter and the manufacturer. Some manufacturers have a particular file format in which they generate the information. This file format may have a designator as to the user, a sequence number or time stamp.

At the same time the data element is created by the capture device **100**, certain other data ("meta data") **106** is captured as well. This meta data may include time and date **158**, location **160**, operator identification **162**, or other information deemed relevant to establish the context of the data element. The time, date and location may be taken from a GPS unit, or may be derived by time-domain analysis of certain types of mobile phone signals or wireless network domains.

In some embodiments of this invention, it may be desirable to use a technique known as steganography to permanently and indelibly embed the meta data directly into the data element. By using one of several well-known steganographic techniques, the data element can be subtly altered such that 1) it is difficult to determine that hidden information is stored in the data element, and 2 even if it is known that hidden information is stored in the data element, retrieval without some secret information (a "key") is difficult. In this way, the data element can be guaranteed authentic even if stripped from external meta data.

Also, at the time of information capture, the capture device may gather additional information from the operator by means of a secondary data converter **108** that relates to defining the context of the data element. For example, after a camera/video recorder takes a picture/video, a microphone (the secondary data converter) might capture the audio describing the image or the audio from the video just captured. This "context description element" **110** is stored along with the data element and the meta data.

At this point, the capture device **100** has in its internal temporary storage the data element, the meta data and optionally the context description element. It now creates a composite data set using one of a number of well-known algorithms for combining multiple data sets into a single data set. For example, the well-known ZIP compression algorithm routinely performs statistical compression on a number of input files and creates a single output file such that, with the proper decompression algorithm, the original set of files can be recovered without data loss. This "combine and compress" function **112** creates a data set called the "composite element." **114**.

The capture device now encrypts the composite element using any of a number of well-known encryption algorithms. In the preferred embodiment, the composite element is first encrypted using a symmetrical cryptosystem **116** using a key **118** shared by the capture device and the storage facility. The resulting "singly-encrypted element" **120** is then hashed. "Hashing" **122** is a technique that generates a digital "signature" for a data set, such that any party wishing to verify the correctness of the data set can easily recalculate the hash and compares it with the previously calculated hash. Hash algorithms have the further property that it is computationally difficult to find multiple data sets that have the same hash value. This calculated hash value ("element hash") **124** becomes part of the meta data set that is to be associated with the data element.

It is now necessary for the capture device to contact the storage facility over some communications medium. This communications medium **126** can be any mechanism that permits near real-time, two-way communication. The specifics of the communication medium are not disclosed here, but could comprise a wireless telephone network, the public switched telephone network, or the Internet. The capture device sends the meta data **106** (now consisting of the time,

date, operator identification, image, video, audio, "context description element" **110**, hash **122** and possibly other data) to the storage facility **128**.

The storage facility validates the meta data received from the capture device and, if authorized, combines and hashes **130** the received meta data and a secret number **132** known only to the storage facility. This hash is appended to the original meta data set and is then returned to the capture device as a "certificate." **134** At a later time, the certificate can be presented to the storage facility to determine if a data element is authentic.

The singly encrypted element **120** is now combined with the certificate **134** and then is further encrypted using an asymmetrical cryptosystem **136** under the public encryption key **164** of the storage facility **128**, designated K_{SU}. This new packet (the "transport packet") **138** is now ready to transmit to the storage facility **128**.

When it receives the transport packet **138**, the storage facility **128** first decrypts **140** the packet **138** using its private decryption key **166** designated as K_{SR}. This gives the storage facility **128** access to the certificate **134** (which contains the meta data **106**). The certificate can be validated **142** by rehashing the meta data **106** and the secret number **132**. Unpacking the certificate **134**, the storage facility **128** now knows the identity of the capture device **100**, and can use this to retrieve the secret, symmetrical key **118** under which the singly encrypted element **120** is encrypted. The storage facility **128** now decrypts **149**) the singly encrypted element **120** to retrieve the composite element **114**; then expands and recovers **150** the composite element to retrieve the data element **104**, the meta data **106**, and the context description element **110**, if present.

Now, the storage facility **128** can store the data element **104** under the owner's account in its mass storage **144**. The storage facility knows the owner's identity because it was disclosed in the meta data **106**. The storage facility also adds "context tags" **146** by methods dependent on the type of data that is being stored.

Context tags **146** are searchable elements derived from either the data element **104** itself or from the context description element **110**. For example, if the data element **104** is a still photograph or video, the storage facility may create context tags that describe elements of the scene or image(s), such as "animal," or "dog," or "Spot," depending on the mechanism that converts the information in the data element or the context description element into a tag.

It is equipment analyze the data elements (photograph, movie, audio recording, etc.) and create **148** a set of appropriate tags. For audio files, this may include a speech-to-text algorithm; for still or moving images, it may include image recognition and identification. Whatever the method used, at the end of the process the set of data to store includes the data element **102**, the context element **110**, and meta data **106** that now includes a set of searchable tags specific to that image, video, audio or other media. **146**, presumed that, as image and voice recognition improve; this task can be fully automated. Therefore, the preferred embodiment of this invention is to have the task automated.

Retrieval of the data elements is performed from some access point **152** remote from the storage facility **128**. To retrieve data elements, a client must prove to the storage facility that the client is authorized to access the desired data element. This can be done in any number of ways, but in the preferred embodiment of the invention, it is a password challenge. The access point **152** creates an authentication request **154** and transmits the request via the communications medium **126** to the storage facility **128**. At the storage facility, the request is authenticated **156**. Once the challenge has been successfully met, the client can access the data elements belonging to it. Details of the authentication process may include password authentication, a challenge/response protocol, or may employ a hardware authentication device.

Once the request for information has been authenticated, the storage facility **128** reads the requested information from the bulk storage device **144** and encrypts **169**) under the public key of the requester **168**, designated as K_{CU}. The encrypted data is then transmitted to the client over the communications medium **126**. Upon arrival, the message is decrypted **172** under the client's private key **170** designated as K_{CR} and the data **174** is recovered.

Once the data has been retrieved, the tags may be edited or removed and new tags added. Other meta data; particularly location and time and date cannot be changed.

Variations of the system include placing the ability to enter tags on the data capture device itself. This could be in the form of a keypad, a touch screen or voice recognition software. If this option were taken, the data packet from the image capture device would include the tags in the meta data rather than a context description element.

Another variation applies to highly secure applications in which it is desirable to keep the data element **104** encrypted even while at the storage facility. In this variation, the data element **104** is encrypted under a symmetrical cryptosystem prior to combination with the meta data **106** and the context description element **110**. This variation precludes the automatic extraction of tags from the data element itself, but still permits tagging based on the context description element.

Referring now to FIG. **2**, there is illustrated a diagrammatic view of the overall operation of the system. In this system, the capture device **100** is disclosed wherein the actual device that captured it, the device **102**, is illustrated as being a digital camera. This has a lens **202** associated therewith, with the output of the camera being a digitized image **204**. This is basically the data element **104** of FIG. **1**. It can be seen that the element **204** is in a digitized format that is typically native to the camera. This can be any type of video capture element for capturing an image **206**.

Once the image is captured, it is stored in a data base **208**. In addition to this information, various associated information such as audio, timestamp, GPS, location, etc. can be collected. One method for collecting the audio information, for example, is to utilize a microphone **210** that will capture the information and then digitize it in a digitizing block **212** utilizing an analog-to-digital converter, for example. This not only converts it to a digital value but, further, will convert it to a particular audio format such as a *.WAV file format. This particular file format is stored in the database **208**. Of course, any other type of digital format could be utilized that is consistent with an audio format. The GPS information for location can be collected with an external GPS system **218** and timestamp information can internally be generated.

After all the information regarding the video information and the audio information, for example, is collected, it is stored in the database **208** and then must be output therefrom. In this embodiment, there are two types of attached information that are to be embedded within the image at a later time. The first set of information is the GPS information, the timestamp information, etc., that is collected automatically with any image. This information is created in a temporal relationship with respect to that particular image at the time of the capture of the image information. This location information, timestamp information, etc., is infor-

mation that is unique to the photograph and defines that image. Further, user information can be provided which defines the user information that is associated with the capture device, i.e., the camera. The additional information, the audio information, is provided in the form of comments and the such which can be stored. Therefore, when the data in the form of the image information is to be transmitted to the remote site, it is combined with the additional GPS, location, timestamp, etc., information and the audio input information.

There is typically provided a unique file format that defines the digital image and this unique file name can be utilized to define all of the secondary information such that there is a unique association of that information with the image. Thereafter, a compress module **220** is provided for compressing the information in a compressed file format such as a *.ZIP file format. This is just a manner to transmit a number of files together. However, at the reception point, when the files are extracted from this *.ZIP file, there must be some way to distinguish the files and again associate them. This is done, for example, with a unique file naming structure. However, there could be other techniques utilized to uniquely identify the association between these different files.

Once this compressed file format is transmitted to the storage facility **128**, it is stored in a database **226**. At this time there will be, for example, a video clip or a video image (such as a still image) stored in association with the various information that is associated therewith. This, in effect, is a relational database that provides data storage in close association with each other. The first thing that must be done is to extract the information from the data. This is done in a block **228** wherein the associated information is extracted from the database, this being the associated information, and then processed. Typically, the associated information will be the audio information in the audio file format. This must be converted. One conversion that is provided for is to convert the audio formatted data to text data. Therefore, one type of audio-to-text converter can be a voice translation system. There are many of these that are provided such as the Dragon Naturally Speaking systems.

Once the text format has been provided, this is a converted to intermediate formatted data, i.e., text data, that can then be processed in a format that can be embedded within a video file or an image file. This can then be converted into HTML data or other data. This will typically be formatted such that it can be defined as a meta tag for association with the video image. This meta tag is then combined with the image in a block **230**. Once combined, this will then be stored in the database in association with the original raw video and raw audio files. Thereafter, there is an access and retrieval block **152** that can allow one to access the particular modified or "tagged" image via a search. There can be provided a search algorithm that searches all of the tagged images. This searching can be performed based upon the GPS location information, the timestamp information, the added audio comment information, etc. Any information that can be provided over and above the video information that was provided in all of the associated information at the camera can then be searched, as this is the information that is contained in the appended information to the image.

Referring now to FIG. **3**, there is illustrated an alternate embodiment wherein substantially all of the combining operation is contained within the capture device **100** or the camera. Again, there is provided the capture device **102** in the form of the camera that captures the image **206**. This is converted and stored in a database **306**. The database **306** is basically the combination of database **208** and the database **226**. Initially, all of the information from the digital video image **204** and the audio information and all other associated information such as the GPS information, timestamp, etc., are all stored in the database **306**. There will be a corresponding process **308** for taking the associated information and converting it into different information, i.e., a meta tag, which is substantially the same as the process **228**. Once the associated process is combined it is converted into that format, then it can be combined with the image in a process block **310**, similar to the process block **230**. Once this occurs, then there is provided a combined video/image with meta data that can be transmitted. This is illustrated as the augmented image **316** which has meta data associated therewith. This is transmitted for storage at the storage facility in a database **318**. This is searchable through the access/retrieval process **152**, as described herein above.

Referring now to FIG. **4**, there is illustrated one exemplary embodiment of the file structure. The image **204** is a digitized image that constitutes a particular file folder that will have a particular video or image format. This could be a JPEG format, an MPEG format or any other type of video format. This is referred to as one having the extension *.VID (for generic purposes). The file format in this embodiment will have a user ID section **402**, a time/date stamp section **404**, a sequence number **406** and a device number **408**. This will have the format of XXX.AAAA.XXX.XXX.VID. The user ID section **402** will define the user of the capture device, this typically being configuration information that is input to the system. The time/date stamp is time and date information that can be taken from an internal clock or it can be derived from some external accurate time source. The sequence number **406** is typically internally generated with a counter that represents an internal sequence that is unique to a particular capture device. However, among different capture devices, the sequence could be the same. The device section **408** is a unique device number given to a particular device. Therefore, with the user ID information, the time/date stamp, the sequence number and the device number, a very unique file number will be generated. Further, the sequence and the time/date information will be different for each file. Thereafter, the information retrieved from the GPS **218** will be disposed in a folder with an extension of, for example, *.GPS. This will be stored in the file folder **208**. The file numbering will be identical to the file nomenclature other than the extension will be identical to that of the digitized video file. Similarly, the audio information will be stored in a file folder with an extension of, for example, *.WAV with the body of the file name being identical to that of the digitized video file. This will all be stored in the database **208** and then combined in a compressed folder of the *.ZIP type. The actual file name for this can be any type of file name and it does not have to be identical or unique with respect to the name. However, there should be some type of unique file name in that, a random filename could be duplicated by other capture devices. Thus, in the preferred embodiment of this disclosure, the unique body of the *.ZIP file will be identical to that associated with the files contained therein such that this will have a filename of "XXX-.AAAA.XXX.XXX.ZIP." This is the file that is transmitted.

As a summary, the system of the present disclosure provides a system for capturing, storing, indexing and retrieving data objects, which can include a capture device, a storage facility and an access point. The system consists of a primary data converter, a secondary data converter, a meta data source, a data combiner and compressor, a symmetrical encryptor, a one-way hash function, an asymmetric encryp-

tor, and a communications port. The primary data converter captures some physical phenomenon such as, but not limited to a still image, a moving image, a sound, or some other factor, into a primary data set. The secondary data converter is capable of capturing some phenomenon into a secondary data set, related to but separate from the information captured by the primary data converter. The meta data source produces a device identifier, time, date, location, and other data related to the information captured by the primary data converter into a meta data set. The source of the time, date and location information is a GPS receiver, a wireless receiver or another receiver. The source of the device identifier is a read-only memory device. The data combiner and compressor is capable of combining the output of the multiple sources of data (the primary data converter, the secondary data converter, and the meta data source) into a single data stream, and then compressing said data stream into a compressed data set such that the compressed data set requires fewer transmission or storage resources than the uncompressed stream, but remains recoverable such that the original data from the primary data converter, the secondary data converter and the meta data source can be recovered without error. The symmetrical encryptor is capable of using a key shared with another party to convert the data stream from the data combiner and compressor into a singly encrypted data set that is unusable by any party other than the party that has knowledge of the key. The one-way hash function is capable of calculating for the encrypted data stream from the symmetric encryptor a number associated with said data stream such that (a) the number represents the data stream, but the data stream is not recoverable from the number, and (b) that it is computationally infeasible to created a second data stream that, when presented to the one-way hash function, produces an identical number. The communications port is capable of sending the meta data and the hash to a second party. The communications port is further capable of receiving from a second party a certificate that has the property of (a) being uniquely and verifiably identified with the meta data and hash of claim **12**, and (b) being verifiably identified as originating with the second party. The asymmetric encryptor is capable of converting the output of the symmetric encryptor and other data into an encrypted information packet that can be read only by a specific second party by means of a pair of related but non-identical keys, the encryption key and the decryption key. The communications port is further capable of conveying the encrypted information packet to a second party. The storage facility consists of a communications port, a device authenticator, an asymmetric decryptor, a validator, a symmetric decryptor, a data expander and recovery device, a tag generator, a mass storage mechanism, an asymmetric encryptor, and a user authenticator. The communications port is capable of receiving a request from validation from the capture device. The device authenticator is capable of verifying that the capture device is authorized to use the storage facility and to create an authentication certificate such that (a) it is computationally infeasible to create a second meta data set or hash that creates an identical authentication record, and (b) the authentication record is uniquely identified with the storage facility. The asymmetric encryptor is capable of using the decryption key to recover the authentication certificate and the singly encrypted data set. The validator is capable of determining if the recovered authentication certificate (a) was generated by the storage facility, and (b) is valid for the presented hash and meta data. The symmetric decryptor is capable of converting the singly encrypted data set into the compressed data set. The data expander and recovery device is capable of converting the compressed data set into the original primary data set, the secondary data set, and the meta data set. The tag generator is capable of taking the primary data set, the secondary data set and the meta data set and producing a set of index tags that describe the primary data set. The tag generator in which the tag generation is performed by a human operator. The tag generation is performed by a speech-to-text function or by an image recognizer. The mass storage mechanism is capable of storing the primary data set, the secondary data set and the meta data set in a way that the information can be retrieved based on the index tags. The user authenticator is capable of receiving requests from access points and verifying their authority to perform retrieval operations at the storage facility.

The system can, at its most condensed version, comprise an asymmetric encryptor capable of converting data read from the mass storage mechanism using a public encryption key into a form usable only by a party with knowledge of a secret key that corresponds to the said public encryption key. The access point consists of an asymmetric decryptor, a communications port and an authentication requester. The authentication requester is capable of identifying the access point and the data element or elements to be recovered from the storage facility in a manner that proves its authority to access said data element or elements.

What is claimed is:

1. A system for capturing image and audio information for storage in a database at a location on a network, comprising:

a microphone interfacable with an external audio information source that generates external audio information and a first data converter for capturing the first external audio information from the microphone,

a camera interfacing with an external image source to capture an image therefrom;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio within the capture device, the camera for processing the captured image and storing it as a stored digital image;

a transmitter for transmitting the stored digital audio and stored digital image to the location on the network; and

a system disposed at the location on the network and including:

a receiver for receiving the transmitted digital audio and digital image from the transmitter as a received set of captured information,

a system data converter for converting the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image, and

the database storing the digital image in association with the text and image recognition context tags.

2. The system of claim **1**, wherein the first data converter captures the first external audio information from the microphone during generation thereof.

3. The system of claim **1**, wherein the camera captures the image from the external image source at an instant in time.

4. The system of claim **1**, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

5. The system of claim 4, wherein the transmitter transmits the stored digital audio information and the stored digital image to the location on the network after at least the stop event associated with the processing of the captured external audio information.

6. A system for capturing image and audio information for storage, comprising:

a capture device having:

internal storage;

a microphone interfacable with and external audio information source that generates external audio information and a first data converter for capturing the first external audio information from the microphone,

a camera interfacing with and external image source to capture an image therefrom;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio in internal storage within the capture device, the camera for processing the captured image and storing it as a stored digital image in internal storage and a combiner for generating an association between the stored digital audio and the stored digital image,

a media data converter for converting the received set of captured information to convert the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image, and

the internal storage storing the digital image in association with the text and image recognition context tags.

7. The system of claim 6, wherein the first data converter captures the first external audio information from the microphone during generation thereof.

8. The system of claim 6, wherein the camera captures the image from the external image source at an instant in time.

9. The system of claim 6, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

10. The system of claim 6, and further including:

a transmitter associated with the capture device for transmitting the associated stored digital image in association with the text and image recognition context tags to the location on the network;

a system disposed at the location on a network and including:

a receiver for receiving the transmitted associated stored digital image in association with the text and image recognition context tags from the transmitter associated with the capture device as a received set of captured information,

a database, and

the database storing the received associated stored digital image in association with the text and image recognition context tags.

11. The system of claim 10, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

12. The system of claim 11, wherein the transmitter transmits the associated stored digital image in association with the text and image recognition context tags to the location on the network after at least the stop event associated with the processing of the captured external audio information.

13. A system for capturing image and audio information for storage, comprising:

internal storage;

a microphone interfacable with an external audio information source that generates external audio information and a first data converter for capturing the first external audio information from the microphone;

a camera interfacing with an image source to capture an image therefrom;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio within the capture device, the camera for processing the captured image and storing it as a stored digital image;

a second data converter for converting the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image; and

the internal storage storing the digital image in association with the text and image recognition context tags.

14. The system of claim 13, wherein the image source is an external image source.

15. The system of claim 13, wherein the first data converter captures the first external audio information from the microphone during generation thereof.

16. The system of claim 13, wherein the camera captures the image from the image source at an instant in time.

17. The system of claim 13, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

* * * * *

EXHIBIT B

US010237067B2

(12) **United States Patent**
Malone

(10) **Patent No.: US 10,237,067 B2**
(45) **Date of Patent: *Mar. 19, 2019**

(54) **APPARATUS FOR VOICE ASSISTANT, LOCATION TAGGING, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAGS/CONTEXTUAL TAGS, STORAGE AND SEARCH RETRIEVAL**

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This patent is subject to a terminal disclaimer.

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G06F 17/30 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04L 9/14*** (2013.01); ***G06F 17/3028*** (2013.01); ***G06F 17/30038*** (2013.01);
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See application file for complete search history.

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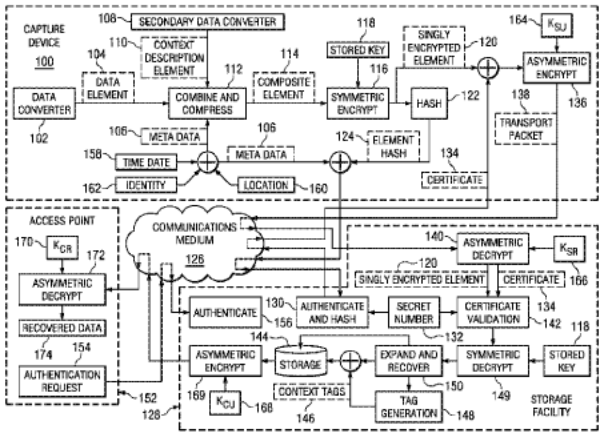
(57) **ABSTRACT**

This invention relates to a network interface device. A first capture device interfaces with a first external information source to capture first external information. A processor processes the captured first external information and stores it in a first media. The processor initiates the storage of the first captured information at an initial time and completes storage of the first captured information at a completion time, thus providing a stored defined set of first captured information. A transmitter transmits the defined set of stored captured information to a remote location on a network. A remote processing system is disposed at the remote node on the network and includes a database and a receiver for receiving the transmitted defined set of first captured information. A data converter is operable to convert the received defined set of first captured information to a second format.
(Continued)



The database stores the set of converted captured information.

17 Claims, 4 Drawing Sheets

Related U.S. Application Data

continuation of application No. 14/660,166, filed on Mar. 17, 2015, which is a continuation of application No. 13/965,625, filed on Aug. 13, 2013, now Pat. No. 8,983,119, which is a continuation of application No. 13/417,229, filed on Mar. 10, 2012, now Pat. No. 8,509,477, which is a continuation of application No. 12/857,358, filed on Aug. 16, 2010, now Pat. No. 8,135,169, which is a continuation of application No. 11/621,062, filed on Jan. 8, 2007, now Pat. No. 7,778,438, which is a continuation-in-part of application No. 11/325,373, filed on Jan. 4, 2006, now Pat. No. 7,184,573, which is a continuation of application No. 10/674,910, filed on Sep. 29, 2003, now Pat. No. 6,996,251.

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H04N 21/41	(2011.01)
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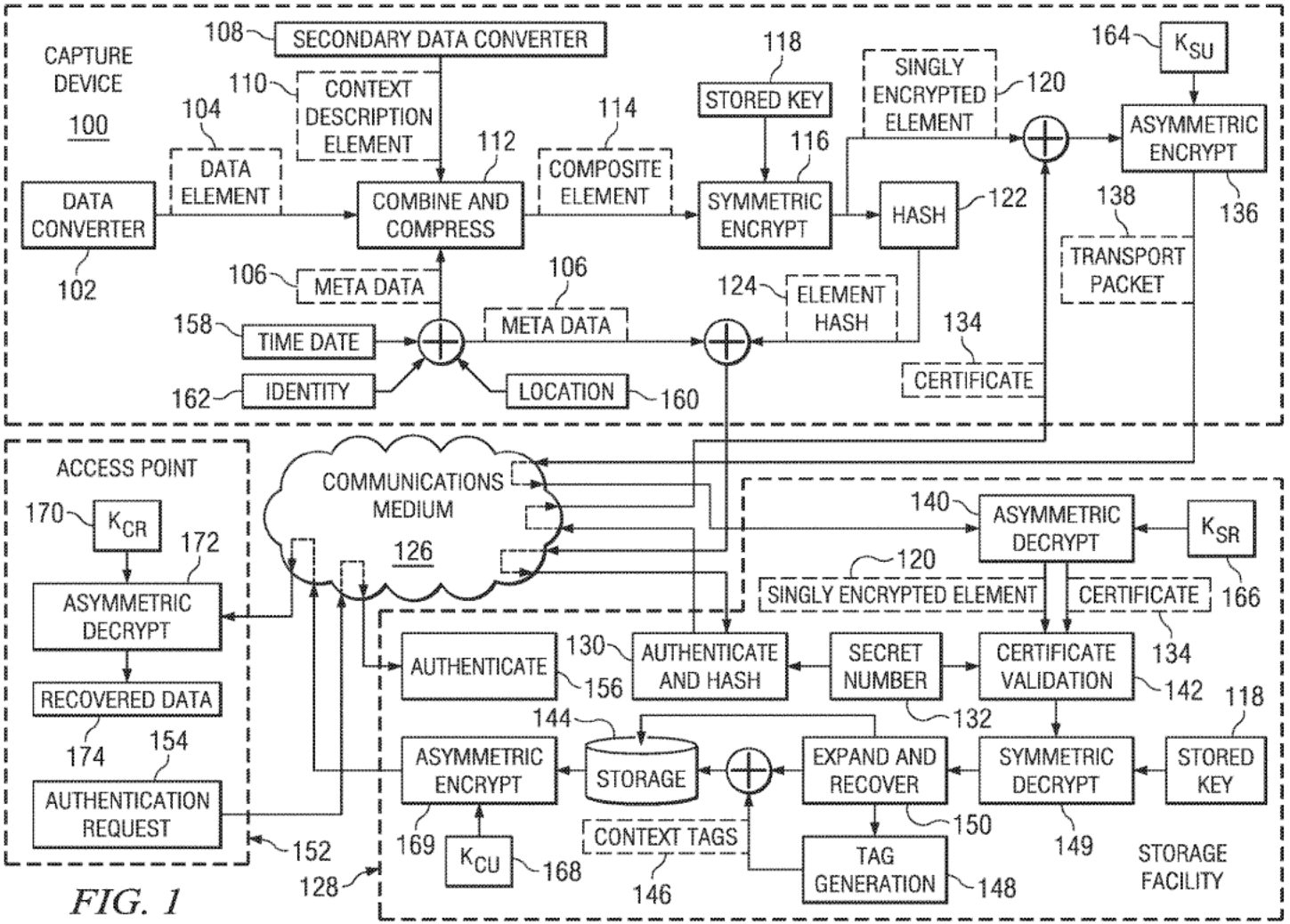

CAPTURE DEVICE
100
DATA CONVERTER
102
DATA ELEMENT
104
SECONDARY DATA CONVERTER
108
CONTEXT DESCRIPTION ELEMENT
110
COMBINE AND COMPRESS
112
COMPOSITE ELEMENT
114
STORED KEY
118
SYMMETRIC ENCRYPT
116
SINGLY ENCRYPTED ELEMENT
120
HASH
122
ELEMENT HASH
124
K_{SU}
164
ASYMMETRIC ENCRYPT
136
TRANSPORT PACKET
138
META DATA
106
META DATA
106
TIME DATE
158
IDENTITY
162
LOCATION
160
CERTIFICATE
134
ACCESS POINT
K_{CR}
170
172
ASYMMETRIC DECRYPT
RECOVERED DATA
174
154
AUTHENTICATION REQUEST
152
128
COMMUNICATIONS MEDIUM
126
K_{SR}
166
ASYMMETRIC DECRYPT
140
SINGLY ENCRYPTED ELEMENT
120
CERTIFICATE
134
AUTHENTICATE
156
AUTHENTICATE AND HASH
130
SECRET NUMBER
132
CERTIFICATE VALIDATION
142
STORED KEY
118
ASYMMETRIC ENCRYPT
169
K_{CU}
168
STORAGE
144
CONTEXT TAGS
146
EXPAND AND RECOVER
150
SYMMETRIC DECRYPT
149
TAG GENERATION
148
STORAGE FACILITY

FIG. 1

FIG. 2

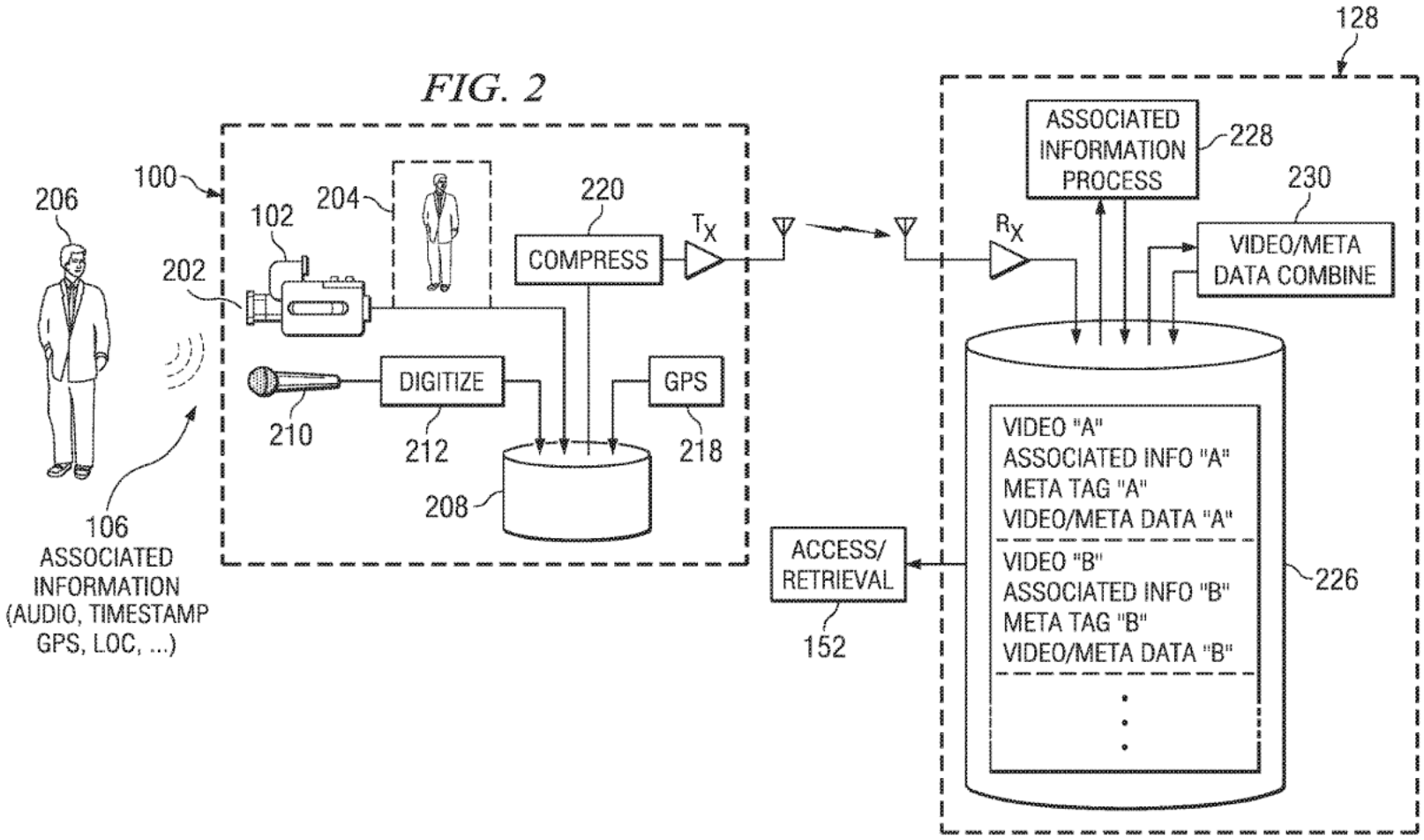
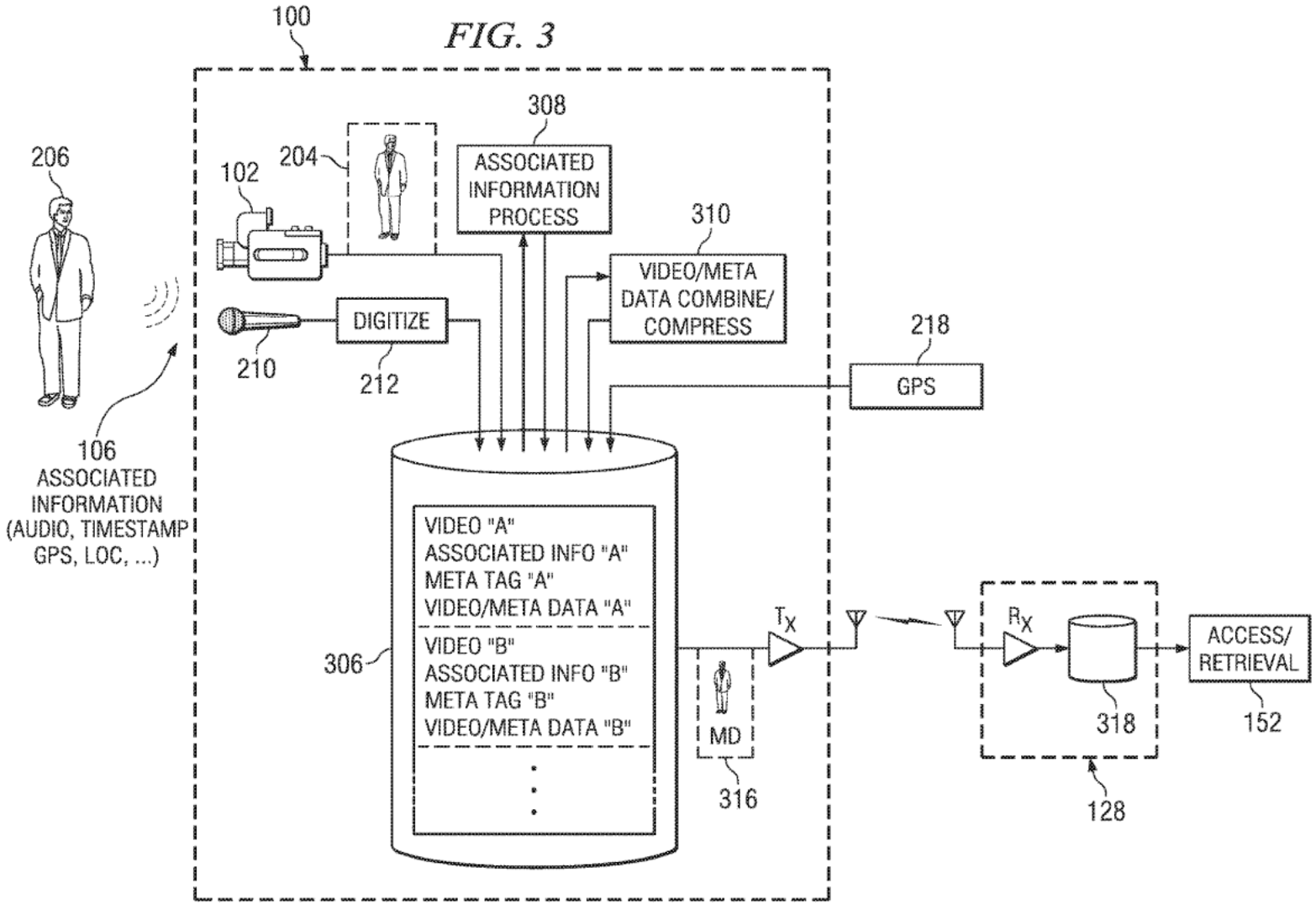

128
ASSOCIATED INFORMATION PROCESS
228
230
VIDEO/META DATA COMBINE
206
100
102
204
220
COMPRESS
T_X
R_X
202
DIGITIZE
GPS
210
212
218
208
106
ASSOCIATED INFORMATION (AUDIO, TIMESTAMP GPS, LOC, ...)
ACCESS/ RETRIEVAL
152
VIDEO "A"
ASSOCIATED INFO "A"
META TAG "A"
VIDEO/META DATA "A"
VIDEO "B"
ASSOCIATED INFO "B"
META TAG "B"
VIDEO/META DATA "B"
226

FIG. 3


100
206
102
204
308
ASSOCIATED INFORMATION PROCESS
310
VIDEO/META DATA COMBINE/ COMPRESS
218
GPS
DIGITIZE
210
212
106
ASSOCIATED INFORMATION (AUDIO, TIMESTAMP GPS, LOC, ...)
VIDEO "A"
ASSOCIATED INFO "A"
META TAG "A"
VIDEO/META DATA "A"
VIDEO "B"
ASSOCIATED INFO "B"
META TAG "B"
VIDEO/META DATA "B"
306
MD
316
Tx
Rx
318
128
ACCESS/ RETRIEVAL
152

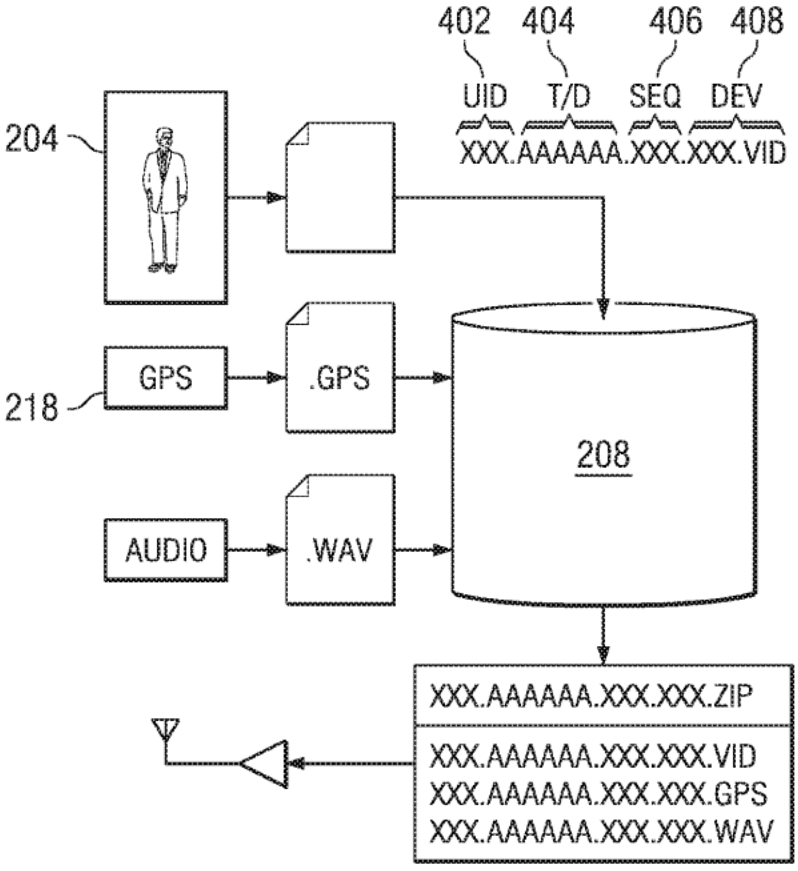

402
404
406
408
UID
T/D
SEQ
DEV
XXX.AAAAAA.XXX.XXX.VID
204
GPS
218
.GPS
208
AUDIO
.WAV
XXX.AAAAAA.XXX.XXX.ZIP
XXX.AAAAAA.XXX.XXX.VID
XXX.AAAAAA.XXX.XXX.GPS
XXX.AAAAAA.XXX.XXX.WAV

FIG. 4

APPARATUS FOR VOICE ASSISTANT, LOCATION TAGGING, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAGS/CONTEXTUAL TAGS, STORAGE AND SEARCH RETRIEVAL

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a Continuation of U.S. patent application Ser. No. 15/272,013, filed on Sep. 21, 2016, entitled APPARATUS FOR PERSONAL VOICE ASSISTANT, LOCATION SERVICES, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAG(S)/CONTEXTUAL TAG(S), STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 9,832,017, issued Nov. 28, 2017. Application Ser. No. 15/272,013 is a continuation of U.S. application Ser. No. 14/660,166, filed Mar. 17, 2015, and entitled METHOD FOR PERSONAL VOICE ASSISTANT, LOCATION SERVICES, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL. U.S. application Ser. No. 14/660,166 is a Continuation of U.S. patent application Ser. No. 13/965,625, filed Aug. 13, 2013, and entitled METHOD FOR VOICE COMMAND ACTIVATION, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 8,983,119, issued on Mar. 17, 2015. U.S. patent application Ser. No. 13/965,625 is a Continuation of U.S. patent application Ser. No. 13/417,229, filed on Mar. 10, 2012, and entitled METHOD FOR MULTI-MEDIA CAPTURE, TRANSMISSION, CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 8,509,477, issued on Aug. 13, 2013, the specifications of which are incorporated herein by reference.

U.S. patent application Ser. No. 13/417,229 is a Continuation of U.S. patent application Ser. No. 12/857,358, filed on Aug. 16, 2010, and entitled METHOD FOR MULTI-MEDIA CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, published as U.S. Patent Application Publication No. US 2010/0303288, now U.S. Pat. No. 8,135,169, issued on Mar. 13, 2012. U.S. Patent Application Publication No. 2010/0303288 and U.S. Pat. No. 8,135,169 are incorporated by reference herein.

U.S. patent application Ser. No. 12/857,358 is a Continuation of U.S. patent application Ser. No. 11/621,062, filed on Jan. 8, 2007, and entitled METHOD FOR MULTI-MEDIA RECOGNITION, DATA CONVERSION, CREATION OF METATAGS, STORAGE AND SEARCH RETRIEVAL, published as U.S. Patent Application Publication No. U.S. 2007/0150517, now U.S. Pat. No. 7,778,438, issued on Aug. 17, 2010. U.S. Patent Application Publication No. U.S. 2007/0150517 and U.S. Pat. No. 7,778,438 are incorporated by reference herein.

U.S. patent application Ser. No. 11/621,062 is a Continuation-in-Part of U.S. patent application Ser. No. 11/325,373, filed Jan. 4, 2006, and entitled APPARATUS FOR CAPTURING INFORMATION AS A FILE AND ENHANCING THE FILE WITH EMBEDDED INFORMATION, published as U.S. Patent Application Publication No. U.S. 2006/0115111, now U.S. Pat. No. 7,184,573, issued on Feb. 27, 2007. Application Ser. No. 11/621,062 claims benefit of U.S. Provisional Application No. 60/757,075, filed on Jan. 6, 2006, and entitled APPARATUS AND METHOD FOR EMBEDDING META-TAGS INTO MEDIA FILES. U.S. Patent Application Publication No. U.S. 2006/0115111 and U.S. Pat. No. 7,184,573 are incorporated by reference herein.

U.S. patent application Ser. No. 11/325,373 is a Continuation of U.S. patent application Ser. No. 10/674,910, filed Sep. 29, 2003, and entitled FORENSIC COMMUNICATION APPARATUS AND METHOD, published as U.S. Patent Application Publication No. U.S. 2004/0125208, now U.S. Pat. No. 6,996,251, issued on Feb. 7, 2006. Application Ser. No. 10/674,910 claims benefit of U.S. Provisional Application No. 60/414,449, filed Sep. 30, 2002, and entitled FORENSIC COMMUNICATION APPARATUS AND METHOD. U.S. Patent Application Publication No. U.S. 2004/0125208, U.S. Pat. No. 6,996,251, and U.S. Application No. 60/414,449 are incorporated by reference herein.

TECHNICAL FIELD

This invention relates to the storage and search retrieval of all types of digital media files, whether music or other audio, still photographs, videos, movies or other types of media.

BACKGROUND

The popularity of digital media devices such as digital cameras, video cameras, mobile phones with audio and video recording capability and portable music devices that have recording capability has exploded in recent years. Instead of recording pictures, video and sound on physical media, modern devices record to rewritable memory devices. This means that the cost to create a new image, movie or audio recording has fallen to near zero, making the number of these recordings available in any given individual's library skyrocket.

But this new ability to store virtually unlimited numbers of media files introduces new problems. First, the sheer number makes it nearly impossible to manually describe and index every media file in one's possession. This means that, for many, photographs, movies and audio recordings are kept in poorly organized computer files and finding any particular picture, movie or recording is a difficult and time-consuming process.

The second problem is the fact that people typically trade up to a new computer every three years or so. This means that hours of video, thousands of pictures or hundreds of audio files must be transferred from the old system to the new—a sometimes daunting task.

A third problem is one can typically access locally stored media files only on the computer on which they reside. If one wishes to share the file with another one must typically employ some file-transfer method ahead of time (email, FTP, public server, etc.)

A fourth problem relates to e-mailing or sending your media files to another party, whereas the receiving party is not able to search the media files for the specific key indexes that the original owner had intended. While there are programs to allow the originator to type in key index words (tags) for searching and retrieving these media files from their personal computer, when these media files are e-mailed or sent to another party, these tags are removed from the media file, therefore the receiving party does not have an

ability to search, sort, display, play or print these media files based on the original owners key indexes.

Finally, those who make a living providing content need some method for proving that a given work belongs to them, and that they are the original creator of the work.

SUMMARY

The present invention disclosed and claimed in one aspect thereof a system for capturing data in a first media and storing in a database at a remote location on a network. A network interface device is provided having a first capture device interfacing with a first external information source that generates external information and capturing the first external information during generation thereof. A processor is provided for processing the captured first external information and storing it in a first media format as stored first captured information within the network interface device, the processor initiating the storage of the first captured information as stored first captured information at an initial time and completes storage of the first captured information as stored first captured information at a completion time, thus providing a stored defined set of first captured information representing the first captured information between the initial time and the completion time. A transmitter is provided for transmitting as a transmitted defined set of first captured information the defined set of stored captured information to a remote location on a network after the completion time. A remote processing system is disposed at the remote node on the network and includes a database and a receiver for receiving the transmitted defined set of first captured information from the transmitter associated with the network interface device as a received defined set of first captured information. A data converter is operable to convert the received defined set of first captured information to a second format as a set of converted first captured information, the second format different than the first media format, the second format being a searchable format. The database then stores the set of converted captured information.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following description taken in conjunction with the accompanying Drawings in which:

FIG. **1** illustrates a block diagram of the overall operation of the system in accordance with the present disclosure.

FIG. **2** illustrates a block diagram of one embodiment of the overall operation of the system in accordance with the present disclosure.

FIG. **3** illustrates a block diagram of another embodiment of the overall operation of the system in accordance with the present disclosure.

FIG. **4** illustrates a block diagram of the file management of the system in accordance with the present disclosure.

DETAILED DESCRIPTION

Referring now to FIG. **1**, there is illustrated a block diagram of the overall operation of the system in accordance with the present disclosure. The invention is best described by beginning with the capture device **100**.

Still pictures, moving pictures, audio, telemetry or other information (hereafter called simply, "information") is gathered by the data converter **102** and organized into one "data element" **104** consisting of a single picture, a movie/video clip, an audio clip, a sample of telemetry data or other logical grouping of related information. The data converter **102** can be any type of data capture information. For pictures, a digital camera can be utilized and, for movie/video clips, the data converter can be a digital video recorder (DVR). In general, the data converter is any type of device that will capture the information and place it in some type of digitized format. As will be understood and discussed herein below, this digitized format is typically native to the data converter and the manufacturer. Some manufacturers have a particular file format in which they generate the information. This file format may have a designator as to the user, a sequence number or time stamp.

At the same time the data element is created by the capture device **100**, certain other data ("meta data") **106** is captured as well. This meta data may include time and date **158**, location **160**, operator identification **162**, or other information deemed relevant to establish the context of the data element. The time, date and location may be taken from a GPS unit, or may be derived by time-domain analysis of certain types of mobile phone signals or wireless network domains.

In some embodiments of this invention, it may be desirable to use a technique known as steganography to permanently and indelibly embed the meta data directly into the data element. By using one of several well-known steganographic techniques, the data element can be subtly altered such that 1) it is difficult to determine that hidden information is stored in the data element, and 2 even if it is known that hidden information is stored in the data element, retrieval without some secret information (a "key") is difficult. In this way, the data element can be guaranteed authentic even if stripped from external meta data.

Also, at the time of information capture, the capture device may gather additional information from the operator by means of a secondary data converter **108** that relates to defining the context of the data element. For example, after a camera/video recorder takes a picture/video, a microphone (the secondary data converter) might capture the audio describing the image or the audio from the video just captured. This "context description element" **110** is stored along with the data element and the meta data.

At this point, the capture device **100** has in its internal temporary storage the data element, the meta data and optionally the context description element. It now creates a composite data set using one of a number of well-known algorithms for combining multiple data sets into a single data set. For example, the well-known ZIP compression algorithm routinely performs statistical compression on a number of input files and creates a single output file such that, with the proper decompression algorithm, the original set of files can be recovered without data loss. This "combine and compress" function **112** creates a data set called the "composite element." **114**.

The capture device now encrypts the composite element using any of a number of well-known encryption algorithms. In the preferred embodiment, the composite element is first encrypted using a symmetrical cryptosystem **116** using a key **118** shared by the capture device and the storage facility. The resulting "singly-encrypted element" **120** is then hashed. "Hashing" **122** is a technique that generates a digital "signature" for a data set, such that any party wishing to verify the correctness of the data set can easily recalculate the hash and compares it with the previously calculated hash. Hash algorithms have the further property that it is computationally difficult to find multiple data sets that have the same

hash value. This calculated hash value ("element hash") **124** becomes part of the meta data set that is to be associated with the data element.

It is now necessary for the capture device to contact the storage facility over some communications medium. This communications medium **126** can be any mechanism that permits near real-time, two-way communication. The specifics of the communication medium are not disclosed here, but could comprise a wireless telephone network, the public switched telephone network, or the Internet. The capture device sends the meta data **106** (now consisting of the time, date, operator identification, image, video, audio, "context description element" **110**, hash **122** and possibly other data) to the storage facility **128**.

The storage facility validates the meta data received from the capture device and, if authorized, combines and hashes **130** the received meta data and a secret number **132** known only to the storage facility. This hash is appended to the original meta data set and is then returned to the capture device as a "certificate." **134** At a later time, the certificate can be presented to the storage facility to determine if a data element is authentic.

The singly encrypted element **120** is now combined with the certificate **134** and then is further encrypted using an asymmetrical cryptosystem **136** under the public encryption key **164** of the storage facility **128**, designated K_{SU}. This new packet (the "transport packet") **138** is now ready to transmit to the storage facility **128**.

When it receives the transport packet **138**, the storage facility **128** first decrypts **140** the packet **138** using its private decryption key **166** designated as K_{SR}. This gives the storage facility **128** access to the certificate **134** (which contains the meta data **106**). The certificate can be validated **142** by rehashing the meta data **106** and the secret number **132**. Unpacking the certificate **134**, the storage facility **128** now knows the identity of the capture device **100**, and can use this to retrieve the secret, symmetrical key **118** under which the singly encrypted element **120** is encrypted. The storage facility **128** now decrypts **149**) the singly encrypted element **120** to retrieve the composite element **114**; then expands and recovers **150** the composite element to retrieve the data element **104**, the meta data **106**, and the context description element **110**, if present.

Now, the storage facility **128** can store the data element **104** under the owner's account in its mass storage **144**. The storage facility knows the owner's identity because it was disclosed in the meta data **106**. The storage facility also adds "context tags" **146** by methods dependent on the type of data that is being stored.

Context tags **146** are searchable elements derived from either the data element **104** itself or from the context description element **110**. For example, if the data element **104** is a still photograph or video, the storage facility may create context tags that describe elements of the scene or image(s), such as "animal," or "dog," or "Spot," depending on the mechanism that converts the information in the data element or the context description element into a tag.

It is equipment analyze the data elements (photograph, movie, audio recording, etc.) and create **148** a set of appropriate tags. For audio files, this may include a speech-to-text algorithm; for still or moving images, it may include image recognition and identification. Whatever the method used, at the end of the process the set of data to store includes the data element **102**, the context element **110**, and meta data **106** that now includes a set of searchable tags specific to that image, video, audio or other media. **146**, presumed that, as image and voice recognition improve; this task can be fully automated. Therefore, the preferred embodiment of this invention is to have the task automated.

Retrieval of the data elements is performed from some access point **152** remote from the storage facility **128**. To retrieve data elements, a client must prove to the storage facility that the client is authorized to access the desired data element. This can be done in any number of ways, but in the preferred embodiment of the invention, it is a password challenge. The access point **152** creates an authentication request **154** and transmits the request via the communications medium **126** to the storage facility **128**. At the storage facility, the request is authenticated **156**. Once the challenge has been successfully met, the client can access the data elements belonging to it. Details of the authentication process may include password authentication, a challenge/response protocol, or may employ a hardware authentication device.

Once the request for information has been authenticated, the storage facility **128** reads the requested information from the bulk storage device **144** and encrypts **169**) under the public key of the requester **168**, designated as K_{CU}. The encrypted data is then transmitted to the client over the communications medium **126**. Upon arrival, the message is decrypted **172** under the client's private key **170** designated as K_{CR} and the data **174** is recovered.

Once the data has been retrieved, the tags may be edited or removed and new tags added. Other meta data; particularly location and time and date cannot be changed.

Variations of the system include placing the ability to enter tags on the data capture device itself. This could be in the form of a keypad, a touch screen or voice recognition software. If this option were taken, the data packet from the image capture device would include the tags in the meta data rather than a context description element.

Another variation applies to highly secure applications in which it is desirable to keep the data element **104** encrypted even while at the storage facility. In this variation, the data element **104** is encrypted under a symmetrical cryptosystem prior to combination with the meta data **106** and the context description element **110**. This variation precludes the automatic extraction of tags from the data element itself, but still permits tagging based on the context description element.

Referring now to FIG. **2**, there is illustrated a diagrammatic view of the overall operation of the system. In this system, the capture device **100** is disclosed wherein the actual device that captured it, the device **102**, is illustrated as being a digital camera. This has a lens **202** associated therewith, with the output of the camera being a digitized image **204**. This is basically the data element **104** of FIG. **1**. It can be seen that the element **204** is in a digitized format that is typically native to the camera. This can be any type of video capture element for capturing an image **206**.

Once the image is captured, it is stored in a data base **208**. In addition to this information, various associated information such as audio, timestamp, GPS, location, etc. can be collected. One method for collecting the audio information, for example, is to utilize a microphone **210** that will capture the information and then digitize it in a digitizing block **212** utilizing an analog-to-digital converter, for example. This not only converts it to a digital value but, further, will convert it to a particular audio format such as a *.WAV file format. This particular file format is stored in the database **208**. Of course, any other type of digital format could be utilized that is consistent with an audio format. The GPS information for location can be collected with an external GPS system **218** and timestamp information can internally be generated.

After all the information regarding the video information and the audio information, for example, is collected, it is stored in the database **208** and then must be output therefrom. In this embodiment, there are two types of attached information that are to be embedded within the image at a later time. The first set of information is the GPS information, the timestamp information, etc., that is collected automatically with any image. This information is created in a temporal relationship with respect to that particular image at the time of the capture of the image information. This location information, timestamp information, etc., is information that is unique to the photograph and defines that image. Further, user information can be provided which defines the user information that is associated with the capture device, i.e., the camera. The additional information, the audio information, is provided in the form of comments and the such which can be stored. Therefore, when the data in the form of the image information is to be transmitted to the remote site, it is combined with the additional GPS, location, timestamp, etc., information and the audio input information.

There is typically provided a unique file format that defines the digital image and this unique file name can be utilized to define all of the secondary information such that there is a unique association of that information with the image. Thereafter, a compress module **220** is provided for compressing the information in a compressed file format such as a *.ZIP file format. This is just a manner to transmit a number of files together. However, at the reception point, when the files are extracted from this *.ZIP file, there must be some way to distinguish the files and again associate them. This is done, for example, with a unique file naming structure. However, there could be other techniques utilized to uniquely identify the association between these different files.

Once this compressed file format is transmitted to the storage facility **128**, it is stored in a database **226**. At this time there will be, for example, a video clip or a video image (such as a still image) stored in association with the various information that is associated therewith. This, in effect, is a relational database that provides data storage in close association with each other. The first thing that must be done is to extract the information from the data. This is done in a block **228** wherein the associated information is extracted from the database, this being the associated information, and then processed. Typically, the associated information will be the audio information in the audio file format. This must be converted. One conversion that is provided for is to convert the audio formatted data to text data. Therefore, one type of audio-to-text converter can be a voice translation system. There are many of these that are provided such as the Dragon Naturally Speaking systems.

Once the text format has been provided, this is a converted to intermediate formatted data, i.e., text data, that can then be processed in a format that can be embedded within a video file or an image file. This can then be converted into HTML data or other data. This will typically be formatted such that it can be defined as a meta tag for association with the video image. This meta tag is then combined with the image in a block **230**. Once combined, this will then be stored in the database in association with the original raw video and raw audio files. Thereafter, there is an access and retrieval block **152** that can allow one to access the particular modified or "tagged" image via a search. There can be provided a search algorithm that searches all of the tagged images. This searching can be performed based upon the GPS location information, the timestamp information, the added audio comment information, etc. Any information that can be provided over and above the video information that was provided in all of the associated information at the camera can then be searched, as this is the information that is contained in the appended information to the image.

Referring now to FIG. **3**, there is illustrated an alternate embodiment wherein substantially all of the combining operation is contained within the capture device **100** or the camera. Again, there is provided the capture device **102** in the form of the camera that captures the image **206**. This is converted and stored in a database **306**. The database **306** is basically the combination of database **208** and the database **226**. Initially, all of the information from the digital video image **204** and the audio information and all other associated information such as the GPS information, timestamp, etc., are all stored in the database **306**. There will be a corresponding process **308** for taking the associated information and converting it into different information, i.e., a meta tag, which is substantially the same as the process **228**. Once the associated process is combined it is converted into that format, then it can be combined with the image in a process block **310**, similar to the process block **230**. Once this occurs, then there is provided a combined video/image with meta data that can be transmitted. This is illustrated as the augmented image **316** which has meta data associated therewith. This is transmitted for storage at the storage facility in a database **318**. This is searchable through the access/retrieval process **152**, as described herein above.

Referring now to FIG. **4**, there is illustrated one exemplary embodiment of the file structure. The image **204** is a digitized image that constitutes a particular file folder that will have a particular video or image format. This could be a JPEG format, an MPEG format or any other type of video format. This is referred to as one having the extension *.VID (for generic purposes). The file format in this embodiment will have a user ID section **402**, a time/date stamp section **404**, a sequence number **406** and a device number **408**. This will have the format of XXX.AAAA.XXX.XXX.VID. The user ID section **402** will define the user of the capture device, this typically being configuration information that is input to the system. The time/date stamp is time and date information that can be taken from an internal clock or it can be derived from some external accurate time source. The sequence number **406** is typically internally generated with a counter that represents an internal sequence that is unique to a particular capture device. However, among different capture devices, the sequence could be the same. The device section **408** is a unique device number given to a particular device. Therefore, with the user ID information, the time/date stamp, the sequence number and the device number, a very unique file number will be generated. Further, the sequence and the time/date information will be different for each file. Thereafter, the information retrieved from the GPS **218** will be disposed in a folder with an extension of, for example, *.GPS. This will be stored in the file folder **208**. The file numbering will be identical to the file nomenclature other than the extension will be identical to that of the digitized video file. Similarly, the audio information will be stored in a file folder with an extension of, for example, *.WAV with the body of the file name being identical to that of the digitized video file. This will all be stored in the database **208** and then combined in a compressed folder of the *.ZIP type. The actual file name for this can be any type of file name and it does not have to be identical or unique with respect to the name. However, there should be some type of unique file name in that, a random filename could be duplicated by other capture devices. Thus,

in the preferred embodiment of this disclosure, the unique body of the *.ZIP file will be identical to that associated with the files contained therein such that this will have a filename of "XXX.AAAA.XXX.XXX.ZIP." This is the file that is transmitted.

As a summary, the system of the present disclosure provides a system for capturing, storing, indexing and retrieving data objects, which can include a capture device, a storage facility and an access point. The system consists of a primary data converter, a secondary data converter, a meta data source, a data combiner and compressor, a symmetrical encryptor, a one-way hash function, an asymmetric encryptor, and a communications port. The primary data converter captures some physical phenomenon such as, but not limited to a still image, a moving image, a sound, or some other factor, into a primary data set. The secondary data converter is capable of capturing some phenomenon into a secondary data set, related to but separate from the information captured by the primary data converter. The meta data source produces a device identifier, time, date, location, and other data related to the information captured by the primary data converter into a meta data set. The source of the time, date and location information is a GPS receiver, a wireless receiver or another receiver. The source of the device identifier is a read-only memory device. The data combiner and compressor is capable of combining the output of the multiple sources of data (the primary data converter, the secondary data converter, and the meta data source) into a single data stream, and then compressing said data stream into a compressed data set such that the compressed data set requires fewer transmission or storage resources than the uncompressed stream, but remains recoverable such that the original data from the primary data converter, the secondary data converter and the meta data source can be recovered without error. The symmetrical encryptor is capable of using a key shared with another party to convert the data stream from the data combiner and compressor into a singly encrypted data set that is unusable by any party other than the party that has knowledge of the key. The one-way hash function is capable of calculating for the encrypted data stream from the symmetric encryptor a number associated with said data stream such that (a) the number represents the data stream, but the data stream is not recoverable from the number, and (b) that it is computationally infeasible to created a second data stream that, when presented to the one-way hash function, produces an identical number. The communications port is capable of sending the meta data and the hash to a second party. The communications port is further capable of receiving from a second party a certificate that has the property of (a) being uniquely and verifiably identified with the meta data and hash of claim **12**, and (b) being verifiably identified as originating with the second party. The asymmetric encryptor is capable of converting the output of the symmetric encryptor and other data into an encrypted information packet that can be read only by a specific second party by means of a pair of related but non-identical keys, the encryption key and the decryption key. The communications port is further capable of conveying the encrypted information packet to a second party. The storage facility consists of a communications port, a device authenticator, an asymmetric decryptor, a validator, a symmetric decryptor, a data expander and recovery device, a tag generator, a mass storage mechanism, an asymmetric encryptor, and a user authenticator. The communications port is capable of receiving a request from validation from the capture device. The device authenticator is capable of verifying that the capture device is authorized to use the storage facility and to create an authentication certificate such that (a) it is computationally infeasible to create a second meta data set or hash that creates an identical authentication record, and (b) the authentication record is uniquely identified with the storage facility. The asymmetric encryptor is capable of using the decryption key to recover the authentication certificate and the singly encrypted data set. The validator is capable of determining if the recovered authentication certificate (a) was generated by the storage facility, and (b) is valid for the presented hash and meta data. The symmetric decryptor is capable of converting the singly encrypted data set into the compressed data set. The data expander and recovery device is capable of converting the compressed data set into the original primary data set, the secondary data set, and the meta data set. The tag generator is capable of taking the primary data set, the secondary data set and the meta data set and producing a set of index tags that describe the primary data set. The tag generator in which the tag generation is performed by a human operator. The tag generation is performed by a speech-to-text function or by an image recognizer. The mass storage mechanism is capable of storing the primary data set, the secondary data set and the meta data set in a way that the information can be retrieved based on the index tags. The user authenticator is capable of receiving requests from access points and verifying their authority to perform retrieval operations at the storage facility.

The system can, at its most condensed version, comprise an asymmetric encryptor capable of converting data read from the mass storage mechanism using a public encryption key into a form usable only by a party with knowledge of a secret key that corresponds to the said public encryption key. The access point consists of an asymmetric decryptor, a communications port and an authentication requester. The authentication requester is capable of identifying the access point and the data element or elements to be recovered from the storage facility in a manner that proves its authority to access said data element or elements.

What is claimed is:

1. A system for capturing image and audio information for storage in a database at a location on a network, comprising:

a microphone interfaceable with an external audio information source that generates external audio information and a first data converter for capturing the external audio information from the microphone,

a camera interfacing with an external image source to capture an image therefrom;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio within the capture device, the camera for processing the captured image and storing it as a stored digital image;

a data capture device for capturing, as captured data, location information and time information associated with at least the capture of the image and storing the captured data as stored captured data;

a data combiner for combining the stored digital audio, stored digital image and stored captured data as a composite data set;

an encryptor for encrypting the composite data set as an encrypted composite data set:

a transmitter for transmitting the encrypted composite data set to the location on the network; and

a system disposed at the location on the network and including:

a receiver for receiving the transmitted encrypted composite data set from the transmitter,

a decryptor decrypting the received encrypted composite data set as a decrypted composite data set to provide the decrypted composite data set as a received set of decrypted captured information,

a system data converter for converting the received digital audio in the decrypted composite data set to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image in the decrypted composite data set and associating the text and image recognition context tags with the digital image in the received decrypted composite data set, and

the database storing the digital image in the decrypted composite data set in association with the text and image recognition context tags as a stored context based digital image and in association with the received captured data in the decrypted composite data set.

2. The system of claim **1**, wherein the first data converter captures the first external audio information from the microphone during generation thereof.

3. The system of claim **1**, wherein the camera captures the image from the external image source at an instant in time.

4. The system of claim **1**, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

5. The system of claim **4**, wherein the transmitter transmits the encrypted composite data set to the location on the network after at least the stop event associated with the processing of the captured external audio information.

6. A system for capturing image and audio information for storage, comprising:

a capture device having:

internal storage;

a microphone interfaceable with and external audio information source that generates external audio information and a first data converter for capturing the first external audio information from the microphone,

a camera interfacing with and external image source to capture an image therefrom;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio in internal storage within the capture device, the camera for processing the captured image and storing it as a stored digital image in internal storage;

a data capture device for capturing, as captured data, location information, and time information associated with at least the capture of the image and storing the captured data as stored captured data;

a media data converter for converting the the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image and the captured data, and

the internal storage storing the digital image in association with the text and image recognition context tags in addition to the stored captured data.

7. The system of claim **6**, wherein the first data converter captures the first external audio information from the microphone during generation thereof.

8. The system of claim **6**, wherein the camera captures the image from the external image source at an instant in time.

9. The system of claim **6**, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

10. The system of claim **6**, and further including:

a transmitter associated with the capture device for transmitting the composite data set to the location on the network;

a system disposed at the location on a network and including:

a receiver for receiving the transmitted composite data set from the transmitter associated with the capture device as a received set of captured information,

a database, and

the database storing the received composite data set.

11. The system of claim **10**, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

12. The system of claim **11**, wherein the transmitter transmits the received composite data set to the location on the network after at least the stop event associated with the processing of the captured external audio information.

13. A system for capturing image and audio information for storage, comprising:

internal storage;

a microphone interfaceable with an external audio information source that generates external audio information and a first data converter for capturing the external audio information from the microphone;

a camera interfacing with an image source to capture an image therefrom;

a data capture device for capturing, as captured data, location information and time information associated with at least the capture of the image and storing the captured data as stored captured data;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio within the capture device, the camera for processing the captured image and storing it as a stored digital image;

a second data converter for converting the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image and with the stored captured data; and

the internal storage storing the digital image in association with the text and image recognition context tags in addition to the stored captured data.

14. The system of claim **13**, wherein the image source is an external image source.

15. The system of claim **13**, wherein the first data converter captures the first external audio information from the microphone during generation thereof.

16. The system of claim **13**, wherein the camera captures the image from the image source at an instant in time.

17. The system of claim **13**, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

* * * * *

EXHIBIT C

US010721066B2

(12) United States Patent
Malone

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(45) Date of Patent: *Jul. 21, 2020

(54) **METHOD FOR VOICE ASSISTANT, LOCATION TAGGING, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAGS/CONTEXTUAL TAGS, STORAGE AND SEARCH RETRIEVAL**

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H04L 9/32 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04L 9/14*** (2013.01); ***G06F 16/48*** (2019.01); ***G06F 16/50*** (2019.01); ***G06F 16/51*** (2019.01);
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See application file for complete search history.

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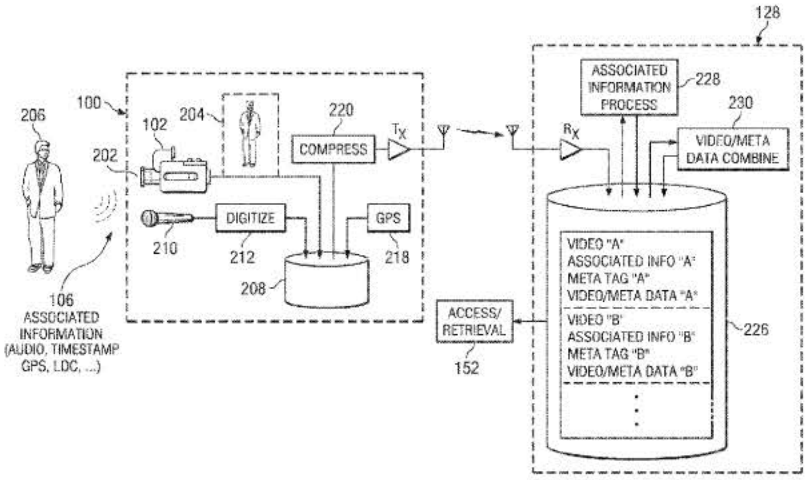
(57) **ABSTRACT**

This invention relates to a network interface device. A first capture device interfaces with a first external information source to capture first external information. A processor processes the captured first external information and stores it in a first media. The processor initiates the storage of the first captured information at an initial time and completes storage of the first captured information at a completion time, thus providing a stored defined set of first captured information. A transmitter transmits the defined set of stored captured information to a remote location on a network. A remote processing system is disposed at the remote node on the network and includes a database and a receiver for receiving the transmitted defined set of first captured information. A data converter is operable to convert the received defined set of first captured information to a second format.
(Continued)



The database stores the set of converted captured information.

17 Claims, 4 Drawing Sheets

Related U.S. Application Data

continuation of application No. 15/272,013, filed on Sep. 21, 2016, now Pat. No. 9,832,017, which is a continuation of application No. 14/660,166, filed on Mar. 17, 2015, now abandoned, which is a continuation of application No. 13/965,625, filed on Aug. 13, 2013, now Pat. No. 8,983,119, which is a continuation of application No. 13/417,229, filed on Mar. 10, 2012, now Pat. No. 8,509,477, which is a continuation of application No. 12/857,358, filed on Aug. 16, 2010, now Pat. No. 8,135,169, which is a continuation of application No. 11/621,062, filed on Jan. 8, 2007, now Pat. No. 7,778,438, which is a continuation-in-part of application No. 11/325,373, filed on Jan. 4, 2006, now Pat. No. 7,184,573, which is a continuation of application No. 10/674,910, filed on Sep. 29, 2003, now Pat. No. 6,996,251.

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H04N 21/658	(2011.01)
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H04N 21/258	(2011.01)
H04N 5/44	(2011.01)
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H04N 5/77	(2006.01)
H04N 5/92	(2006.01)

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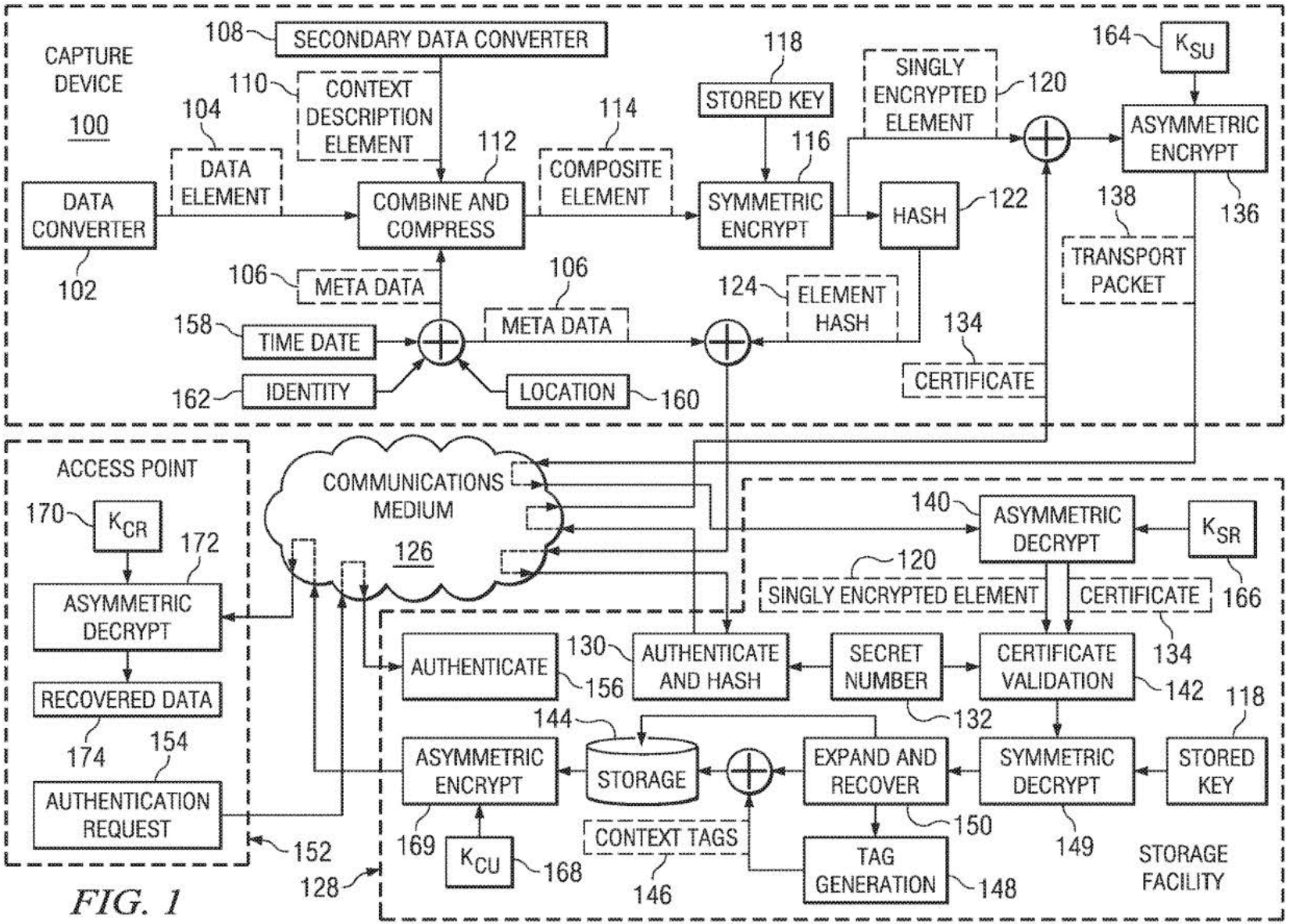

CAPTURE DEVICE
100
108
SECONDARY DATA CONVERTER
110
CONTEXT DESCRIPTION ELEMENT
104
DATA ELEMENT
DATA CONVERTER
102
112
COMBINE AND COMPRESS
114
COMPOSITE ELEMENT
118
STORED KEY
116
SYMMETRIC ENCRYPT
SINGLY ENCRYPTED ELEMENT
120
HASH
122
164
K_{SU}
ASYMMETRIC ENCRYPT
136
138
TRANSPORT PACKET
106
META DATA
158
TIME DATE
162
IDENTITY
106
META DATA
LOCATION
160
124
ELEMENT HASH
134
CERTIFICATE
ACCESS POINT
170
K_{CR}
172
ASYMMETRIC DECRYPT
RECOVERED DATA
174
154
AUTHENTICATION REQUEST
152
128
COMMUNICATIONS MEDIUM
126
140
ASYMMETRIC DECRYPT
K_{SR}
166
120
SINGLY ENCRYPTED ELEMENT
CERTIFICATE
134
AUTHENTICATE
130
156
AUTHENTICATE AND HASH
SECRET NUMBER
132
CERTIFICATE VALIDATION
142
118
STORED KEY
144
ASYMMETRIC ENCRYPT
STORAGE
EXPAND AND RECOVER
150
SYMMETRIC DECRYPT
149
169
K_{CU}
168
CONTEXT TAGS
146
TAG GENERATION
148
STORAGE FACILITY

FIG. 1

FIG. 2

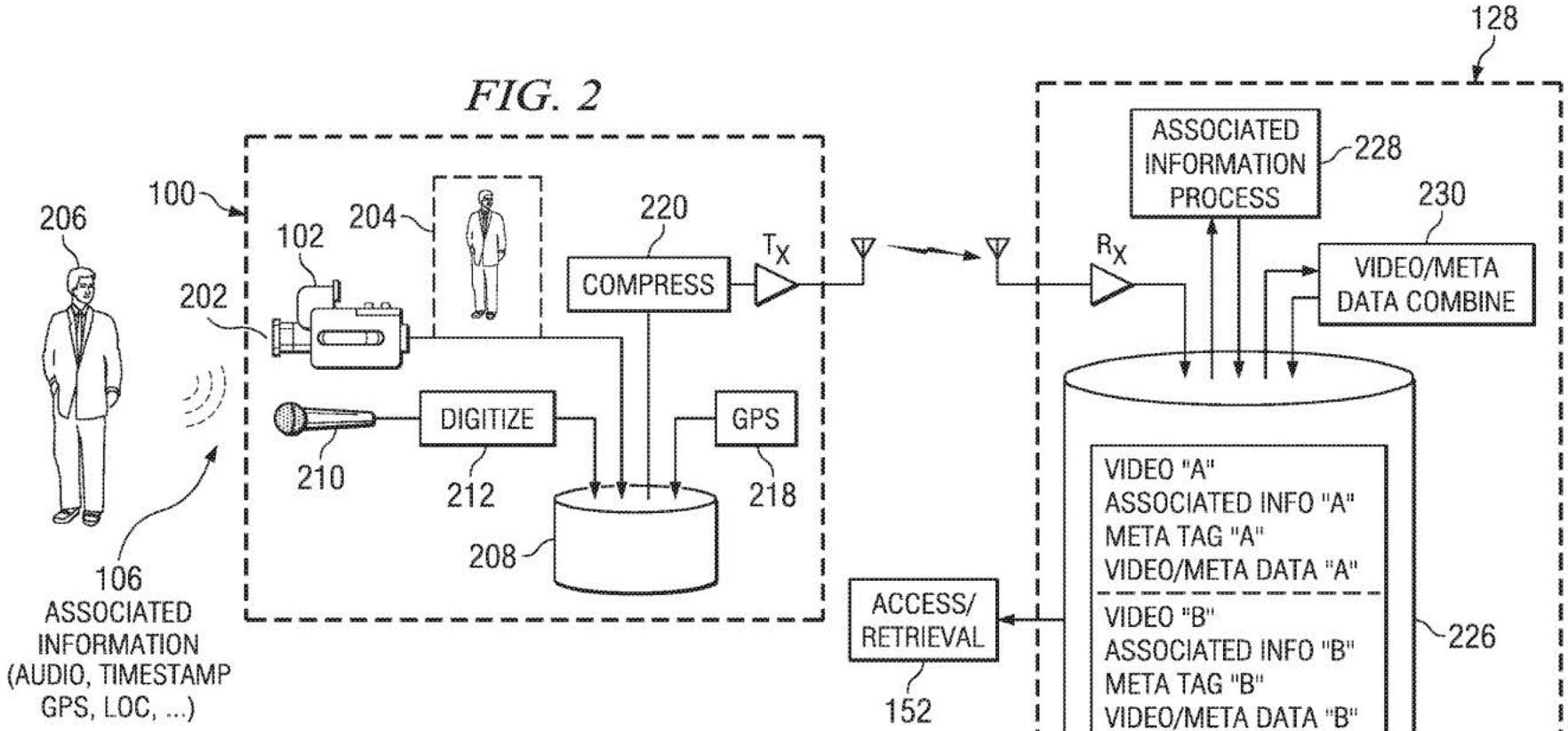
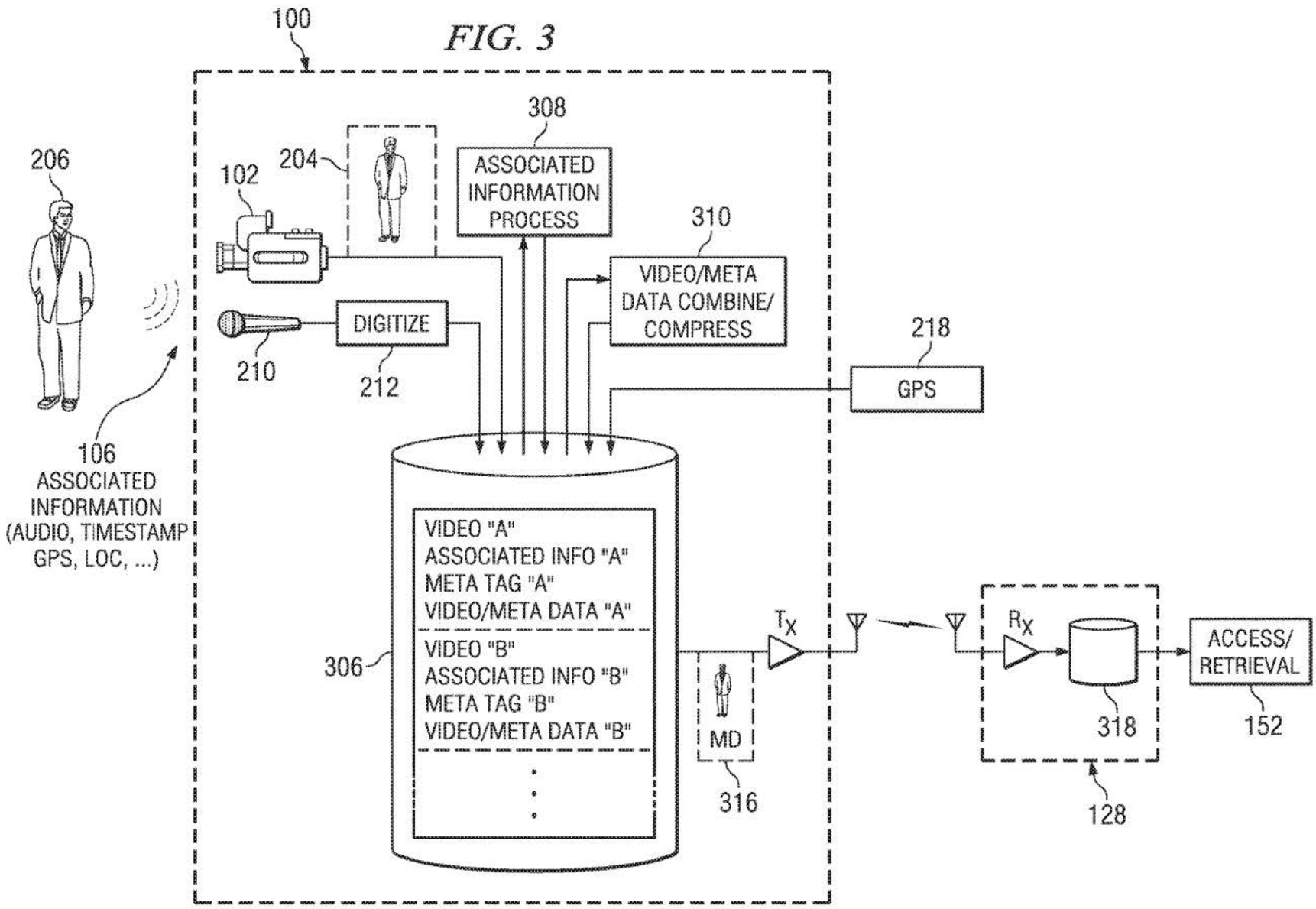

128
100
206
102
204
220
202
COMPRESS
Tx
Rx
ASSOCIATED INFORMATION PROCESS
228
230
VIDEO/META DATA COMBINE
DIGITIZE
GPS
210
212
218
208
VIDEO "A"
ASSOCIATED INFO "A"
META TAG "A"
VIDEO/META DATA "A"
VIDEO "B"
ASSOCIATED INFO "B"
META TAG "B"
VIDEO/META DATA "B"
226
ACCESS/ RETRIEVAL
152
106
ASSOCIATED INFORMATION (AUDIO, TIMESTAMP GPS, LOC, ...)

FIG. 3


100
206
102
204
308
ASSOCIATED INFORMATION PROCESS
310
VIDEO/META DATA COMBINE/ COMPRESS
DIGITIZE
210
212
218
GPS
106
ASSOCIATED INFORMATION (AUDIO, TIMESTAMP GPS, LOC, ...)
VIDEO "A"
ASSOCIATED INFO "A"
META TAG "A"
VIDEO/META DATA "A"
VIDEO "B"
ASSOCIATED INFO "B"
META TAG "B"
VIDEO/META DATA "B"
306
MD
316
Tx
Rx
318
128
ACCESS/ RETRIEVAL
152

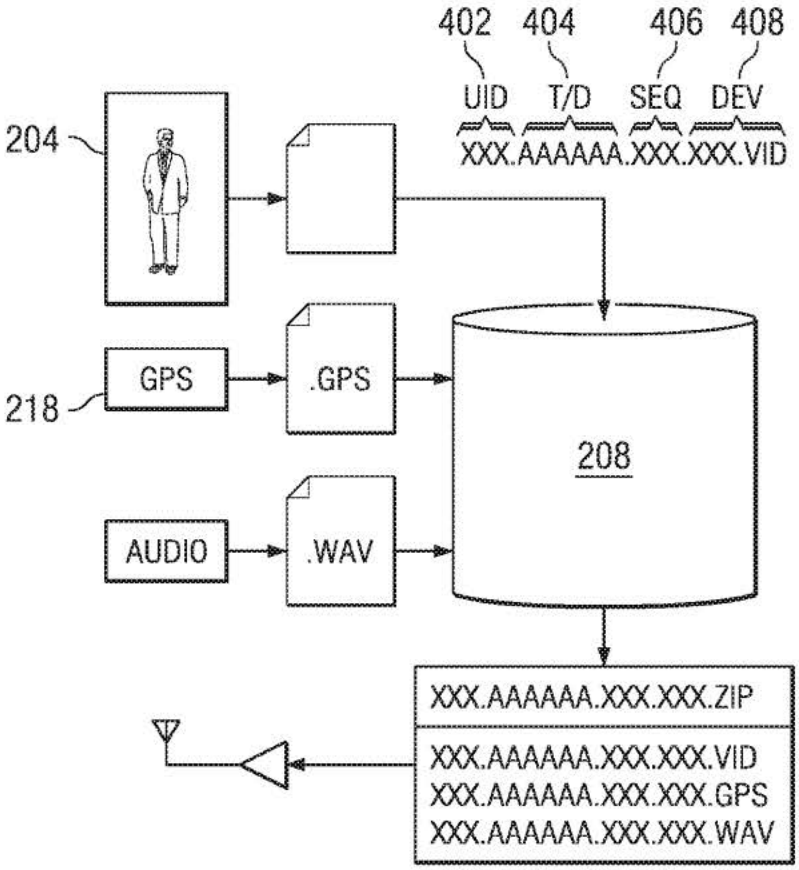

402
404
406
408
UID
T/D
SEQ
DEV
XXX.AAAAAA.XXX.XXX.VID
204
GPS
218
.GPS
208
AUDIO
.WAV
XXX.AAAAAA.XXX.XXX.ZIP
XXX.AAAAAA.XXX.XXX.VID
XXX.AAAAAA.XXX.XXX.GPS
XXX.AAAAAA.XXX.XXX.WAV

FIG. 4

METHOD FOR VOICE ASSISTANT, LOCATION TAGGING, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAGS/CONTEXTUAL TAGS, STORAGE AND SEARCH RETRIEVAL

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a Continuation of U.S. patent application Ser. No. 15/824,087, filed on Nov. 28, 2017, entitled APPARATUS FOR VOICE ASSISTANT, LOCATION TAGGING, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAGS/CONTEXTUAL TAGS, STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 10,237,067, issued Mar. 19, 2019. Application Ser. No. 15/824,087 is a Continuation of U.S. application Ser. No. 15/272,013, filed on Sep. 21, 2016, entitled APPARATUS FOR PERSONAL VOICE ASSISTANT, LOCATION SERVICES, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH TO TEXT CONVERSION, PHOTO/VIDEO IMAGE/OBJECT RECOGNITION, CREATION OF SEARCHABLE METATAG(S)/CONTEXTUAL TAG(S), STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 9,832,017, issued Nov. 28, 2017. Application Ser. No. 15/272,013 is a Continuation of U.S. application Ser. No. 14/660,166, filed Mar. 17, 2015, and entitled METHOD FOR PERSONAL VOICE ASSISTANT, LOCATION SERVICES, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL. U.S. application Ser. No. 14/660,166 is a Continuation of U.S. patent application Ser. No. 13/965,625, filed Aug. 13, 2013, and entitled METHOD FOR VOICE COMMAND ACTIVATION, MULTI-MEDIA CAPTURE, TRANSMISSION, SPEECH CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 8,983,119, issued on Mar. 17, 2015. U.S. patent application Ser. No. 13/965,625 is a Continuation of U.S. patent application Ser. No. 13/417,229, filed on Mar. 10, 2012, and entitled METHOD FOR MULTI-MEDIA CAPTURE, TRANSMISSION, CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, now U.S. Pat. No. 8,509,477, issued on Aug. 13, 2013, the specifications of which are incorporated by reference herein.

U.S. patent application Ser. No. 13/417,229 is a Continuation of U.S. patent application Ser. No. 12/857,358, filed on Aug. 16, 2010, and entitled METHOD FOR MULTI-MEDIA CONVERSION, METATAGS CREATION, STORAGE AND SEARCH RETRIEVAL, published as U.S. Patent Application Publication No. US 2010/0303288, now U.S. Pat. No. 8,135,169, issued on Mar. 13, 2012. U.S. Patent Application Publication No. 2010/0303288 and U.S. Pat. No. 8,135,169 are incorporated by reference herein.

U.S. patent application Ser. No. 12/857,358 is a Continuation of U.S. patent application Ser. No. 11/621,062, filed on Jan. 8, 2007, and entitled METHOD FOR MULTI-MEDIA RECOGNITION, DATA CONVERSION, CREATION OF METATAGS, STORAGE AND SEARCH RETRIEVAL, published as U.S. Patent Application Publication No. U.S. 2007/0150517, now U.S. Pat. No. 7,778,438, issued on Aug. 17, 2010. U.S. Patent Application Publication No. U.S. 2007/0150517 and U.S. Pat. No. 7,778,438 are incorporated by reference herein.

U.S. patent application Ser. No. 11/621,062 is a Continuation-in-Part of U.S. patent application Ser. No. 11/325,373, filed Jan. 4, 2006, and entitled APPARATUS FOR CAPTURING INFORMATION AS A FILE AND ENHANCING THE FILE WITH EMBEDDED INFORMATION, published as U.S. Patent Application Publication No. U.S. 2006/0115111, now U.S. Pat. No. 7,184,573, issued on Feb. 27, 2007. Application Ser. No. 11/621,062 claims benefit of U.S. Provisional Application No. 60/757,075, filed on Jan. 6, 2006, and entitled APPARATUS AND METHOD FOR EMBEDDING META-TAGS INTO MEDIA FILES. U.S. Patent Application Publication No. U.S. 2006/0115111 and U.S. Pat. No. 7,184,573 are incorporated by reference herein.

U.S. patent application Ser. No. 11/325,373 is a Continuation of U.S. patent application Ser. No. 10/674,910, filed Sep. 29, 2003, and entitled FORENSIC COMMUNICATION APPARATUS AND METHOD, published as U.S. Patent Application Publication No. U.S. 2004/0125208, now U.S. Pat. No. 6,996,251, issued on Feb. 7, 2006. Application Ser. No. 10/674,910 claims benefit of U.S. Provisional Application No. 60/414,449, filed Sep. 30, 2002, and entitled FORENSIC COMMUNICATION APPARATUS AND METHOD. U.S. Patent Application Publication No. U.S. 2004/0125208, U.S. Pat. No. 6,996,251, and U.S. Application No. 60/414,449 are incorporated by reference herein.

TECHNICAL FIELD

This invention relates to the storage and search retrieval of all types of digital media files, whether music or other audio, still photographs, videos, movies or other types of media.

BACKGROUND

The popularity of digital media devices such as digital cameras, video cameras, mobile phones with audio and video recording capability and portable music devices that have recording capability has exploded in recent years. Instead of recording pictures, video and sound on physical media, modern devices record to rewritable memory devices. This means that the cost to create a new image, movie or audio recording has fallen to near zero, making the number of these recordings available in any given individual's library skyrocket.

But this new ability to store virtually unlimited numbers of media files introduces new problems. First, the sheer number makes it nearly impossible to manually describe and index every media file in one's possession. This means that, for many, photographs, movies and audio recordings are kept in poorly organized computer files and finding any particular picture, movie or recording is a difficult and time-consuming process.

The second problem is the fact that people typically trade up to a new computer every three years or so. This means that hours of video, thousands of pictures or hundreds of audio files must be transferred from the old system to the new—a sometimes daunting task.

A third problem is one can typically access locally stored media files only on the computer on which they reside. If one

wishes to share the file with another one must typically employ some file-transfer method ahead of time (email, FTP, public server, etc.)

A fourth problem relates to e-mailing or sending your media files to another party, whereas the receiving party is not able to search the media files for the specific key indexes that the original owner had intended. While there are programs to allow the originator to type in key index words (tags) for searching and retrieving these media files from their personal computer, when these media files are e-mailed or sent to another party, these tags are removed from the media file, therefore the receiving party does not have an ability to search, sort, display, play or print these media files based on the original owners key indexes.

Finally, those who make a living providing content need some method for proving that a given work belongs to them, and that they are the original creator of the work.

SUMMARY

The present invention disclosed and claimed in one aspect thereof a system for capturing data in a first media and storing in a database at a remote location on a network. A network interface device is provided having a first capture device interfacing with a first external information source that generates external information and capturing the first external information during generation thereof. A processor is provided for processing the captured first external information and storing it in a first media format as stored first captured information within the network interface device, the processor initiating the storage of the first captured information as stored first captured information at an initial time and completes storage of the first captured information as stored first captured information at a completion time, thus providing a stored defined set of first captured information representing the first captured information between the initial time and the completion time. A transmitter is provided for transmitting as a transmitted defined set of first captured information the defined set of stored captured information to a remote location on a network after the completion time. A remote processing system is disposed at the remote node on the network and includes a database and a receiver for receiving the transmitted defined set of first captured information from the transmitter associated with the network interface device as a received defined set of first captured information. A data converter is operable to convert the received defined set of first captured information to a second format as a set of converted first captured information, the second format different than the first media format, the second format being a searchable format. The database then stores the set of converted captured information.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following description taken in conjunction with the accompanying Drawings in which:

FIG. **1** illustrates a block diagram of the overall operation of the system in accordance with the present disclosure.

FIG. **2** illustrates a block diagram of one embodiment of the overall operation of the system in accordance with the present disclosure.

FIG. **3** illustrates a block diagram of another embodiment of the overall operation of the system in accordance with the present disclosure.

FIG. **4** illustrates a block diagram of the file management of the system in accordance with the present disclosure.

DETAILED DESCRIPTION

Referring now to FIG. **1**, there is illustrated a block diagram of the overall operation of the system in accordance with the present disclosure. The invention is best described by beginning with the capture device **100**.

Still pictures, moving pictures, audio, telemetry or other information (hereafter called simply, "information") is gathered by the data converter **102** and organized into one "data element" **104** consisting of a single picture, a movie/video clip, an audio clip, a sample of telemetry data or other logical grouping of related information. The data converter **102** can be any type of data capture information. For pictures, a digital camera can be utilized and, for movie/video clips, the data converter can be a digital video recorder (DVR). In general, the data converter is any type of device that will capture the information and place it in some type of digitized format. As will be understood and discussed herein below, this digitized format is typically native to the data converter and the manufacturer. Some manufacturers have a particular file format in which they generate the information. This file format may have a designator as to the user, a sequence number or time stamp.

At the same time the data element is created by the capture device **100**, certain other data ("meta data") **106** is captured as well. This meta data may include time and date **158**, location **160**, operator identification **162**, or other information deemed relevant to establish the context of the data element. The time, date and location may be taken from a GPS unit, or may be derived by time-domain analysis of certain types of mobile phone signals or wireless network domains.

In some embodiments of this invention, it may be desirable to use a technique known as steganography to permanently and indelibly embed the meta data directly into the data element. By using one of several well-known steganographic techniques, the data element can be subtly altered such that 1) it is difficult to determine that hidden information is stored in the data element, and 2 even if it is known that hidden information is stored in the data element, retrieval without some secret information (a "key") is difficult. In this way, the data element can be guaranteed authentic even if stripped from external meta data.

Also, at the time of information capture, the capture device may gather additional information from the operator by means of a secondary data converter **108** that relates to defining the context of the data element. For example, after a camera/video recorder takes a picture/video, a microphone (the secondary data converter) might capture the audio describing the image or the audio from the video just captured. This "context description element" **110** is stored along with the data element and the meta data.

At this point, the capture device **100** has in its internal temporary storage the data element, the meta data and optionally the context description element. It now creates a composite data set using one of a number of well-known algorithms for combining multiple data sets into a single data set. For example, the well-known ZIP compression algorithm routinely performs statistical compression on a number of input files and creates a single output file such that, with the proper decompression algorithm, the original set of files can be recovered without data loss. This "combine and compress" function **112** creates a data set called the "composite element." **114**.

The capture device now encrypts the composite element using any of a number of well-known encryption algorithms. In the preferred embodiment, the composite element is first encrypted using a symmetrical cryptosystem **116** using a key **118** shared by the capture device and the storage facility. The resulting "singly-encrypted element" **120** is then hashed. "Hashing" **122** is a technique that generates a digital "signature" for a data set, such that any party wishing to verify the correctness of the data set can easily recalculate the hash and compares it with the previously calculated hash. Hash algorithms have the further property that it is computationally difficult to find multiple data sets that have the same hash value. This calculated hash value ("element hash") **124** becomes part of the meta data set that is to be associated with the data element.

It is now necessary for the capture device to contact the storage facility over some communications medium. This communications medium **126** can be any mechanism that permits near real-time, two-way communication. The specifics of the communication medium are not disclosed here, but could comprise a wireless telephone network, the public switched telephone network, or the Internet. The capture device sends the meta data **106** (now consisting of the time, date, operator identification, image, video, audio, "context description element" **110**, hash **122** and possibly other data) to the storage facility **128**.

The storage facility validates the meta data received from the capture device and, if authorized, combines and hashes **130** the received meta data and a secret number **132** known only to the storage facility. This hash is appended to the original meta data set and is then returned to the capture device as a "certificate." **134** At a later time, the certificate can be presented to the storage facility to determine if a data element is authentic.

The singly encrypted element **120** is now combined with the certificate **134** and then is further encrypted using an asymmetrical cryptosystem **136** under the public encryption key **164** of the storage facility **128**, designated K_{SU}. This new packet (the "transport packet") **138** is now ready to transmit to the storage facility **128**.

When it receives the transport packet **138**, the storage facility **128** first decrypts **140** the packet **138** using its private decryption key **166** designated as K_{SR}. This gives the storage facility **128** access to the certificate **134** (which contains the meta data **106**). The certificate can be validated **142** by rehashing the meta data **106** and the secret number **132**. Unpacking the certificate **134**, the storage facility **128** now knows the identity of the capture device **100**, and can use this to retrieve the secret, symmetrical key **118** under which the singly encrypted element **120** is encrypted. The storage facility **128** now decrypts **149**) the singly encrypted element **120** to retrieve the composite element **114**; then expands and recovers **150** the composite element to retrieve the data element **104**, the meta data **106**, and the context description element **110**, if present.

Now, the storage facility **128** can store the data element **104** under the owner's account in its mass storage **144**. The storage facility knows the owner's identity because it was disclosed in the meta data **106**. The storage facility also adds "context tags" **146** by methods dependent on the type of data that is being stored.

Context tags **146** are searchable elements derived from either the data element **104** itself or from the context description element **110**. For example, if the data element **104** is a still photograph or video, the storage facility may create context tags that describe elements of the scene or image(s), such as "animal," or "dog," or "Spot," depending on the mechanism that converts the information in the data element or the context description element into a tag.

It is equipment analyze the data elements (photograph, movie, audio recording, etc.) and create **148** a set of appropriate tags. For audio files, this may include a speech-to-text algorithm; for still or moving images, it may include image recognition and identification. Whatever the method used, at the end of the process the set of data to store includes the data element **102**, the context element **110**, and meta data **106** that now includes a set of searchable tags specific to that image, video, audio or other media. **146**, presumed that, as image and voice recognition improve; this task can be fully automated. Therefore, the preferred embodiment of this invention is to have the task automated.

Retrieval of the data elements is performed from some access point **152** remote from the storage facility **128**. To retrieve data elements, a client must prove to the storage facility that the client is authorized to access the desired data element. This can be done in any number of ways, but in the preferred embodiment of the invention, it is a password challenge. The access point **152** creates an authentication request **154** and transmits the request via the communications medium **126** to the storage facility **128**. At the storage facility, the request is authenticated **156**. Once the challenge has been successfully met, the client can access the data elements belonging to it. Details of the authentication process may include password authentication, a challenge/response protocol, or may employ a hardware authentication device.

Once the request for information has been authenticated, the storage facility **128** reads the requested information from the bulk storage device **144** and encrypts **169**) under the public key of the requester **168**, designated as K_{CU}. The encrypted data is then transmitted to the client over the communications medium **126**. Upon arrival, the message is decrypted **172** under the client's private key **170** designated as K_{CR} and the data **174** is recovered.

Once the data has been retrieved, the tags may be edited or removed and new tags added. Other meta data; particularly location and time and date cannot be changed.

Variations of the system include placing the ability to enter tags on the data capture device itself. This could be in the form of a keypad, a touch screen or voice recognition software. If this option were taken, the data packet from the image capture device would include the tags in the meta data rather than a context description element.

Another variation applies to highly secure applications in which it is desirable to keep the data element **104** encrypted even while at the storage facility. In this variation, the data element **104** is encrypted under a symmetrical cryptosystem prior to combination with the meta data **106** and the context description element **110**. This variation precludes the automatic extraction of tags from the data element itself, but still permits tagging based on the context description element.

Referring now to FIG. **2**, there is illustrated a diagrammatic view of the overall operation of the system. In this system, the capture device **100** is disclosed wherein the actual device that captured it, the device **102**, is illustrated as being a digital camera. This has a lens **202** associated therewith, with the output of the camera being a digitized image **204**. This is basically the data element **104** of FIG. **1**. It can be seen that the element **204** is in a digitized format that is typically native to the camera. This can be any type of video capture element for capturing an image **206**.

Once the image is captured, it is stored in a data base **208**. In addition to this information, various associated information such as audio, timestamp, GPS, location, etc. can be

collected. One method for collecting the audio information, for example, is to utilize a microphone **210** that will capture the information and then digitize it in a digitizing block **212** utilizing an analog-to-digital converter, for example. This not only converts it to a digital value but, further, will convert it to a particular audio format such as a *.WAV file format. This particular file format is stored in the database **208**. Of course, any other type of digital format could be utilized that is consistent with an audio format. The GPS information for location can be collected with an external GPS system **218** and timestamp information can internally be generated.

After all the information regarding the video information and the audio information, for example, is collected, it is stored in the database **208** and then must be output therefrom. In this embodiment, there are two types of attached information that are to be embedded within the image at a later time. The first set of information is the GPS information, the timestamp information, etc., that is collected automatically with any image. This information is created in a temporal relationship with respect to that particular image at the time of the capture of the image information. This location information, timestamp information, etc., is information that is unique to the photograph and defines that image. Further, user information can be provided which defines the user information that is associated with the capture device, i.e., the camera. The additional information, the audio information, is provided in the form of comments and the such which can be stored. Therefore, when the data in the form of the image information is to be transmitted to the remote site, it is combined with the additional GPS, location, timestamp, etc., information and the audio input information.

There is typically provided a unique file format that defines the digital image and this unique file name can be utilized to define all of the secondary information such that there is a unique association of that information with the image. Thereafter, a compress module **220** is provided for compressing the information in a compressed file format such as a *.ZIP file format. This is just a manner to transmit a number of files together. However, at the reception point, when the files are extracted from this *.ZIP file, there must be some way to distinguish the files and again associate them. This is done, for example, with a unique file naming structure. However, there could be other techniques utilized to uniquely identify the association between these different files.

Once this compressed file format is transmitted to the storage facility **128**, it is stored in a database **226**. At this time there will be, for example, a video clip or a video image (such as a still image) stored in association with the various information that is associated therewith. This, in effect, is a relational database that provides data storage in close association with each other. The first thing that must be done is to extract the information from the data. This is done in a block **228** wherein the associated information is extracted from the database, this being the associated information, and then processed. Typically, the associated information will be the audio information in the audio file format. This must be converted. One conversion that is provided for is to convert the audio formatted data to text data. Therefore, one type of audio-to-text converter can be a voice translation system. There are many of these that are provided such as the Dragon Naturally Speaking systems.

Once the text format has been provided, this is a converted to intermediate formatted data, i.e., text data, that can then be processed in a format that can be embedded within a video file or an image file. This can then be converted into HTML data or other data. This will typically be formatted such that it can be defined as a meta tag for association with the video image. This meta tag is then combined with the image in a block **230**. Once combined, this will then be stored in the database in association with the original raw video and raw audio files. Thereafter, there is an access and retrieval block **152** that can allow one to access the particular modified or "tagged" image via a search. There can be provided a search algorithm that searches all of the tagged images. This searching can be performed based upon the GPS location information, the timestamp information, the added audio comment information, etc. Any information that can be provided over and above the video information that was provided in all of the associated information at the camera can then be searched, as this is the information that is contained in the appended information to the image.

Referring now to FIG. **3**, there is illustrated an alternate embodiment wherein substantially all of the combining operation is contained within the capture device **100** or the camera. Again, there is provided the capture device **102** in the form of the camera that captures the image **206**. This is converted and stored in a database **306**. The database **306** is basically the combination of database **208** and the database **226**. Initially, all of the information from the digital video image **204** and the audio information and all other associated information such as the GPS information, timestamp, etc., are all stored in the database **306**. There will be a corresponding process **308** for taking the associated information and converting it into different information, i.e., a meta tag, which is substantially the same as the process **228**. Once the associated process is combined it is converted into that format, then it can be combined with the image in a process block **310**, similar to the process block **230**. Once this occurs, then there is provided a combined video/image with meta data that can be transmitted. This is illustrated as the augmented image **316** which has meta data associated therewith. This is transmitted for storage at the storage facility in a database **318**. This is searchable through the access/retrieval process **152**, as described herein above.

Referring now to FIG. **4**, there is illustrated one exemplary embodiment of the file structure. The image **204** is a digitized image that constitutes a particular file folder that will have a particular video or image format. This could be a JPEG format, an MPEG format or any other type of video format. This is referred to as one having the extension *.VID (for generic purposes). The file format in this embodiment will have a user ID section **402**, a time/date stamp section **404**, a sequence number **406** and a device number **408**. This will have the format of XXX.AAAA.XXX.XXX.VID. The user ID section **402** will define the user of the capture device, this typically being configuration information that is input to the system. The time/date stamp is time and date information that can be taken from an internal clock or it can be derived from some external accurate time source. The sequence number **406** is typically internally generated with a counter that represents an internal sequence that is unique to a particular capture device. However, among different capture devices, the sequence could be the same. The device section **408** is a unique device number given to a particular device. Therefore, with the user ID information, the time/date stamp, the sequence number and the device number, a very unique file number will be generated. Further, the sequence and the time/date information will be different for each file. Thereafter, the information retrieved from the GPS **218** will be disposed in a folder with an extension of, for example, *.GPS. This will be stored in the file folder **208**. The file

numbering will be identical to the file nomenclature other than the extension will be identical to that of the digitized video file. Similarly, the audio information will be stored in a file folder with an extension of, for example, *.WAV with the body of the file name being identical to that of the digitized video file. This will all be stored in the database **208** and then combined in a compressed folder of the *.ZIP type. The actual file name for this can be any type of file name and it does not have to be identical or unique with respect to the name. However, there should be some type of unique file name in that, a random filename could be duplicated by other capture devices. Thus, in the preferred embodiment of this disclosure, the unique body of the *.ZIP file will be identical to that associated with the files contained therein such that this will have a filename of "XXX-.AAAA.XXX.XXX.ZIP." This is the file that is transmitted.

As a summary, the system of the present disclosure provides a system for capturing, storing, indexing and retrieving data objects, which can include a capture device, a storage facility and an access point. The system consists of a primary data converter, a secondary data converter, a meta data source, a data combiner and compressor, a symmetrical encryptor, a one-way hash function, an asymmetric encryptor, and a communications port. The primary data converter captures some physical phenomenon such as, but not limited to a still image, a moving image, a sound, or some other factor, into a primary data set. The secondary data converter is capable of capturing some phenomenon into a secondary data set, related to but separate from the information captured by the primary data converter. The meta data source produces a device identifier, time, date, location, and other data related to the information captured by the primary data converter into a meta data set. The source of the time, date and location information is a GPS receiver, a wireless receiver or another receiver. The source of the device identifier is a read-only memory device. The data combiner and compressor is capable of combining the output of the multiple sources of data (the primary data converter, the secondary data converter, and the meta data source) into a single data stream, and then compressing said data stream into a compressed data set such that the compressed data set requires fewer transmission or storage resources than the uncompressed stream, but remains recoverable such that the original data from the primary data converter, the secondary data converter and the meta data source can be recovered without error. The symmetrical encryptor is capable of using a key shared with another party to convert the data stream from the data combiner and compressor into a singly encrypted data set that is unusable by any party other than the party that has knowledge of the key. The one-way hash function is capable of calculating for the encrypted data stream from the symmetric encryptor a number associated with said data stream such that (a) the number represents the data stream, but the data stream is not recoverable from the number, and (b) that it is computationally infeasible to created a second data stream that, when presented to the one-way hash function, produces an identical number. The communications port is capable of sending the meta data and the hash to a second party. The communications port is further capable of receiving from a second party a certificate that has the property of (a) being uniquely and verifiably identified with the meta data and hash of claim **12**, and (b) being verifiably identified as originating with the second party. The asymmetric encryptor is capable of converting the output of the symmetric encryptor and other data into an encrypted information packet that can be read only by a specific second party by means of a pair of related but non-identical keys, the encryption key and the decryption key. The communications port is further capable of conveying the encrypted information packet to a second party. The storage facility consists of a communications port, a device authenticator, an asymmetric decryptor, a validator, a symmetric decryptor, a data expander and recovery device, a tag generator, a mass storage mechanism, an asymmetric encryptor, and a user authenticator. The communications port is capable of receiving a request from validation from the capture device. The device authenticator is capable of verifying that the capture device is authorized to use the storage facility and to create an authentication certificate such that (a) it is computationally infeasible to create a second meta data set or hash that creates an identical authentication record, and (b) the authentication record is uniquely identified with the storage facility. The asymmetric encryptor is capable of using the decryption key to recover the authentication certificate and the singly encrypted data set. The validator is capable of determining if the recovered authentication certificate (a) was generated by the storage facility, and (b) is valid for the presented hash and meta data. The symmetric decryptor is capable of converting the singly encrypted data set into the compressed data set. The data expander and recovery device is capable of converting the compressed data set into the original primary data set, the secondary data set, and the meta data set. The tag generator is capable of taking the primary data set, the secondary data set and the meta data set and producing a set of index tags that describe the primary data set. The tag generator in which the tag generation is performed by a human operator. The tag generation is performed by a speech-to-text function or by an image recognizer. The mass storage mechanism is capable of storing the primary data set, the secondary data set and the meta data set in a way that the information can be retrieved based on the index tags. The user authenticator is capable of receiving requests from access points and verifying their authority to perform retrieval operations at the storage facility.

The system can, at its most condensed version, comprise an asymmetric encryptor capable of converting data read from the mass storage mechanism using a public encryption key into a form usable only by a party with knowledge of a secret key that corresponds to the said public encryption key. The access point consists of an asymmetric decryptor, a communications port and an authentication requester. The authentication requester is capable of identifying the access point and the data element or elements to be recovered from the storage facility in a manner that proves its authority to access said data element or elements.

What is claimed is:

1. A method for capturing image and audio information for storage in a database at a location on a network, comprising the steps of:

interfacing a microphone with an external audio information source that generates external audio information and converting with a first data converter the external audio information from the microphone,

interfacing a camera with an external image source to capture an image therefrom;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio within the capture device, the camera for processing the captured image and storing it as a stored digital image;

capturing with a data capture device, as captured data, location information and time information associated

with at least the capture of the image and storing the captured data as stored captured data;

combining with a data combiner for the stored digital audio, stored digital image and stored captured data as a composite data set;

encrypting the composite data set as an encrypted composite data set;

transmitting with a transmitter the encrypted composite data set to the location on the network; and

wherein a system disposed at the location on the network operates to:

receive the transmitted encrypted composite data set from the transmitter,

decrypt the received encrypted composite data set as a decrypted composite data set to provide the decrypted composite data set as a received set of decrypted captured information,

converting with a system data converter the received digital audio in the decrypted composite data set to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image in the decrypted composite data set and associating the text and image recognition context tags with the digital image in the received decrypted composite data set, and

storing in the database the digital image in the decrypted composite data set in association with the text and image recognition context tags as a stored context based digital image and in association with the received captured data in the decrypted composite data set.

2. The method of claim **1**, wherein the first data converter captures the first external audio information from the microphone during generation thereof.

3. The method of claim **1**, wherein the camera captures the image from the external image source at an instant in time.

4. The method of claim **1**, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

5. The method of claim **4**, wherein the step of transmitting transmits the encrypted composite data set to the location on the network after at least the stop event associated with the processing of the captured external audio information.

6. A method for capturing image and audio information for storage, comprising:

executing a capture operation with a capture device by the steps of:

providing internal storage;

interfacing a microphone with an external audio information source that generates external audio information and converting with a first data converter the first external audio information from the microphone,

interfacing a camera with an external image source to capture an image therefrom;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio in internal storage within the capture device, the camera for processing the captured image and storing it as a stored digital image in internal storage;

capturing with a data capture device, as captured data, location information, and time information associated with at least the capture of the image and storing the captured data as stored captured data;

converting with a media data converter the received digital audio to a text based searchable file as a text context tag and creating an image recognition searchable context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image and the captured data, and

storing in the internal storage the digital image in association with the text and image recognition context tags in addition to the stored captured data.

7. The method of claim **6**, wherein the first data converter captures the first external audio information from the microphone during generation thereof.

8. The method of claim **6**, wherein the step of capturing captures the image with the camera from the external image source at an instant in time.

9. The method of claim **6**, wherein the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

10. The method of claim **6**, and further including:

transmitting with a transmitter associated with the capture device the composite data set to the location on the network;

wherein a system disposed at the location on a network operates to

receive with a receiver the transmitted composite data set from the transmitter associated with the capture device as a received set of captured information,

provide a database, and

store in the database the received composite data set.

11. The method of claim **10**, wherein the step of capturing with the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

12. The method of claim **11**, wherein the step of transmitting transmits the received composite data set to the location on the network after at least the stop event associated with the processing of the captured external audio information.

13. A method for capturing image and audio information for storage, comprising the steps of:

providing internal storage;

interfacing a microphone with an external audio information source that generates external audio information and converting with a first data converter the external audio information from the microphone;

interfacing a camera with an image source to capture an image therefrom;

capturing with a capture device, as captured data, location information and time information associated with at least the capture of the image and storing the captured data as stored captured data;

the first data converter processing the captured external audio information and storing it in a first digital audio format as stored digital audio within the capture device, the camera for processing the captured image and storing it as a stored digital image;

converting with a second data converter the received digital audio to a text based searchable file as a text context tag and creating an image recognition search-

able context tag with image recognition of at least a portion of the digital image and associating the text and image recognition context tags with the digital image and with the stored captured data; and

storing in the internal storage the digital image in association with the text and image recognition context tags in addition to the stored captured data.

14. The method of claim **13**, wherein the image source is an external image source.

15. The method of claim **13**, wherein the step of converting with the first data converter captures the first external audio information from the microphone during generation thereof.

16. The method of claim **13**, wherein the step of capturing captures with the camera the image from the image source at an instant in time.

17. The method of claim **13**, wherein the step of converting with the first data converter processes the captured external audio information from a start event representing the time that capture of the external audio information is initiated to a stop event representing the time that capture of the external audio information is complete.

* * * * *

EXHIBIT D

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

MYPORT, INC., *Plaintiff*, v. SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG ELECTRONICS AMERICA, INC., *Defendants*.	§ § § § § § § § § § §	CIVIL ACTION NO. 2:22-CV-00114-JRG **FILED UNDER SEAL**

ORDER

The Court held a hearing in the above-captioned case on Thursday, January 4, 2024 regarding various motions filed by Plaintiff MyPort, Inc. ("MyPort") and Defendants Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Samsung"). (*See* Dkt. Nos. 117, 118, 119, 121, 122, 124, 125, 127, 128, 194, 195.) This Order memorializes the Court's rulings on the pretrial motions as announced from the bench into the record. Although this Order summarizes the Court's rulings as announced into the record during the January 4 hearing, this Order in no way limits or constrains such rulings from the bench as reflected in the record. Accordingly, it is hereby **ORDERED** as follows:

1. **Samsung's Motion for Summary Judgment of Limitation on Damages for Failure to Mark (Dkt. No. 117).**

The Court **GRANTED** the Motion. The Court found that Motorola was licensed to the patents-in-suit, that Samsung has satisfied its *Arctic Cat* burden, and that MyPort failed to show evidence that the identified products did not practice the patents-in-suit.

2. **Samsung's Motion to Exclude Certain Opinions and Testimony of Jae Young Bang, Ph.D., Including His Proposed Claim Constructions and Reliance Thereon (Dkt. No. 118).**

This Motion was **GRANTED-AS-MODIFED**. Dr. Bang's opinions crossed into improper claim construction. Accordingly, the Court struck Dr. Bang's opinions that a "first data converter" is a "secondary data converter," and Dr. Bang's opinions that "media data converter" and "second data converter" preclude a data converter from accepting any user input.

3. **MyPort's Motion for Summary Judgment on Samsung's License Defense (Dkt. No. 119).**

Samsung withdrew its license defense, so the Motion was **DENIED-AS-MOOT**.

4. **MyPort's Motion to Strike and Exclude Expert Opinions of Dr. Bederson Regarding Previously Undisclosed Non-Infringement Theories and Contractual Interpretation (Dkt. No. 121).**

MyPort withdraw the portion of its motion regarding contract interpretation because Samsung withdrew its license defense. The Court **DENIED** the balance of the Motion.

5. **Samsung's Motion for Summary Judgment of Invalidity Under 35 U.S.C. § 101 (Dkt. No. 122).**

This Motion was **GRANTED-IN-PART** and **DENIED-IN-PART**. The Court found that the patents-in-suit were directed to an abstract idea under Step 1 of *Alice*, and that there were outstanding fact issues under Step 2 of *Alice*.

6. **MyPort's *Daubert* Motion to Exclude Certain Opinions of Dr. Robert Vigil (Dkt. No. 124).**

The Court **DENIED** the Motion. The Court found that MyPort's arguments went to weight, not admissibility, and can be adequately addressed through vigorous cross examination.

7. **Samsung's Motion to Exclude the Opinions and Testimony of Dr. Scott J. Savage and Jim W. Bergman (Dkt. No. 125).**

The Motion was **DENIED**. The Court found that none of the flaws or irregularities raised by Samsung were so severe as to warrant exclusion. Instead, they can be adequately addressed by vigorous cross-examination.

8. **Samsung's Motion to Exclude the Testimony of Ravin Balakrishnan, Ph.D. (Dkt. No. 127).**

The Court **CARRIED** the portion of the Motion concerning the "camera interfacing with" language in the patents-in-suit.

The Court **DENIED-AS-MOOT** the portion of the Motion concerning Google Voice Typing/Google Voice Input.

The Cout **DENIED** the balance of the Motion. Samsung's complaints concerning Dr. Balakrishnan's opinions about Samsung's state of mind did not warrant exclusion. Dr. Balakrishnan is entitled to testify to his opinion of Samsung's state of mind based on underlying facts with which he is familiar. That said, Dr. Balakrishnan does not have personal knowledge of Samsung's state of mind and shall not testify as such.

9. **Samsung's Motion for Summary Judgment of No Infringement (Dkt. No. 128).**

This Motion was **CARRIED**.

10. **Samsung's Motion to Strike MyPort's Undisclosed Smartphone-Plus-Server Theory From its Summary Judgment Briefing and to Preclude MyPort From Advancing that Undisclosed Theory at Trial (Dkt. No. 194).**

The Court **DENIED** the Motion. The Court found that Samsung was on sufficient notice of the theory it now complains of.

11. Samsung's Motion for Leave to File a Supplemental Brief Regarding its Motion to Exclude Certain Opinions and Testimony of Jae Young Bang, Ph.D. Including His Proposed Claim Constructions and Reliance Thereon (Dkt. No. 195).

This Motion was **DENIED-AS-MOOT**.

12. MyPort's Motions *In Limine* (Dkt. No. 323).

MyPort's MIL 1: MyPort withdrew this motion *in limine* so it was **DENIED-AS-MOOT**.

MyPort's MIL 2: **GRANTED-AS-AGREED**: Samsung will not introduce evidence, argument, or testimony that Samsung's accused products practice the prior art or that "practicing the prior art" is a proper defense to patent infringement, but may refer to Samsung patents to respond to MyPort's damages theories.

MyPort's MIL 3: **DENIED**.

MyPort's MIL 4: MyPort withdrew this MIL so it was **DENIED-AS-MOOT**.

13. Samsung's Opposed Motions *In Limine* (Dkt. No. 325).

Samsung's MIL 1: **GRANTED-AS-AGREED**: Plaintiff shall be precluded from introducing evidence, testimony, or argument that Google Voice Typing, when combined with any Samsung product, software, or service, infringes directly, indirectly, literally or by equivalents any asserted claim of any patent-in-suit.

Samsung's MIL 2: **GRANTED-AS-AGREED**: Plaintiff shall be precluded from introducing evidence, testimony, or argument that Bixby Dictation (also referred to as Bixby Voice) infringes directly, indirectly, literally or by equivalents any asserted claim of any patent-in-suit.

Samsung's MIL 3: **DENIED**.

Samsung's MIL 4: The Court **ORDERED** Samsung to produce updated financial data by 11:59 p.m. CT on January 9, 2024, MyPort to update its expert report within 48 hours of receiving the

financial data in light of that data, and MyPort to promptly thereafter put up its damages expert for a deposition that shall not exceed three (3) hours in length. In light of this, this motion *in limine* was **DENIED-AS-MOOT**.

* * * * *

The Court notes that the following motions *in limine* were agreed to by the parties (Dkt. No. 219 at 20–21), and based on such agreements are **GRANTED**:

Agreed MIL 1: [redacted]

Agreed MIL 2: The parties will not introduce evidence, argument, or testimony regarding communications made in connection with any settlement discussion or mediation between the parties or their agents in this litigation. Nothing in this *in limine* order is intended to make otherwise admissible evidence inadmissible simply because it was used or relied upon during mediation proceedings or during settlement discussions.

So ORDERED and SIGNED this 5th day of January, 2024.

RODNEY GILSTRAP
UNITED STATES DISTRICT JUDGE

EXHIBIT E

FILED UNDER SEAL PURSUANT TO PROTECTIVE ORDER

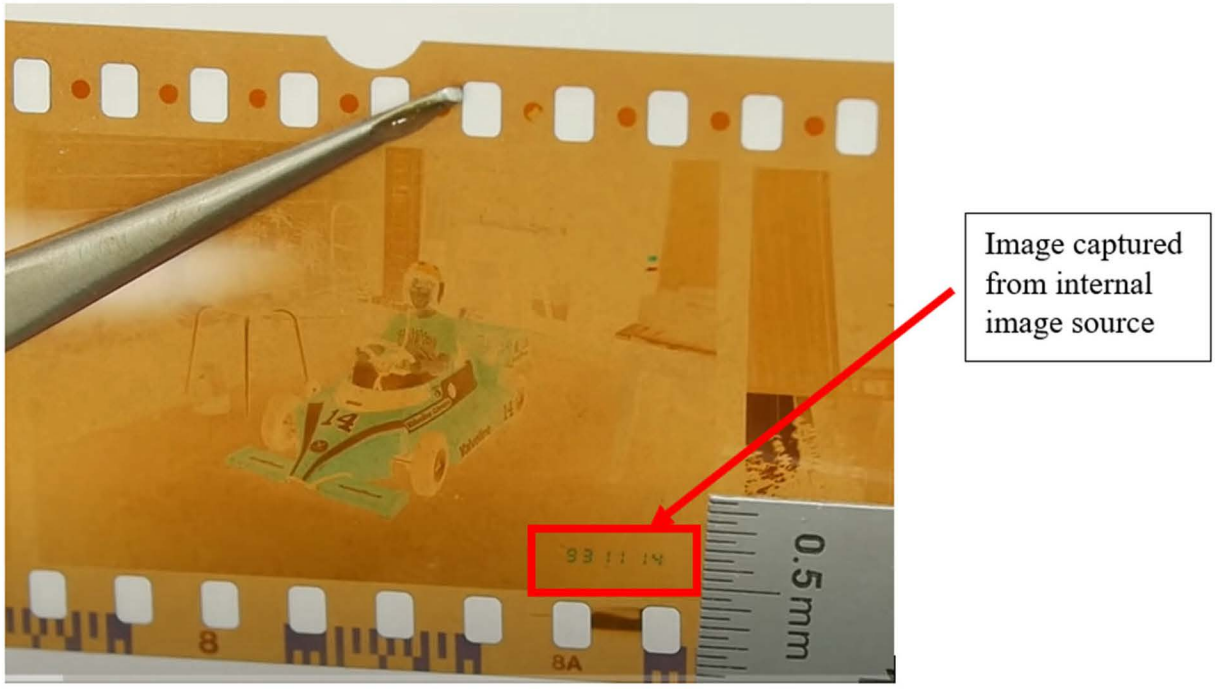
EXHIBIT A

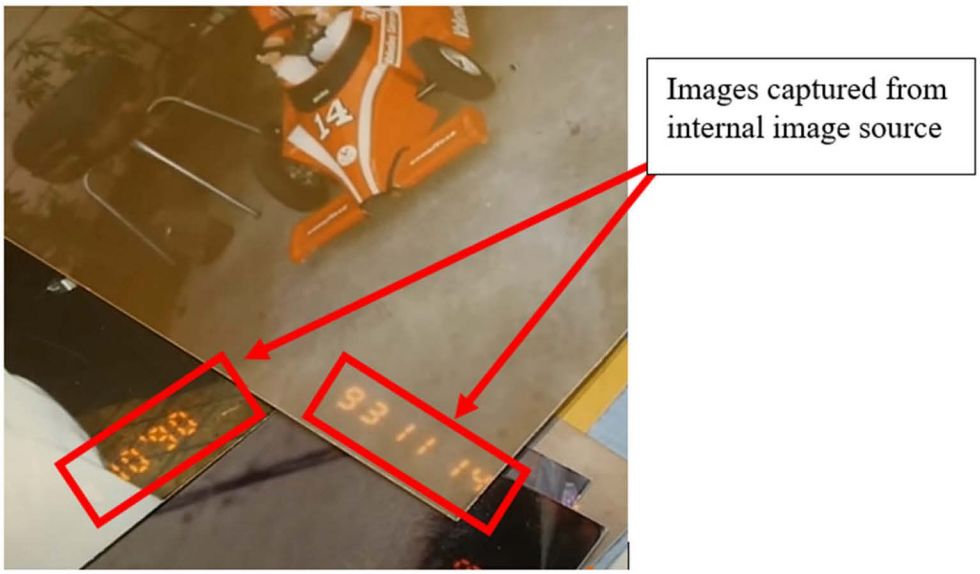
RESTRICTED – ATTORNEYS' EYES ONLY

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

MYPORT, INC., Plaintiff, v. SAMSUNG ELECTRONICS CO., LTD., AND SAMSUNG ELECTRONICS AMERICA, INC., Defendants.	Civil Action No. 2:22-CV-00114-JRG

REBUTTAL EXPERT REPORT OF JAE YOUNG BANG, Ph.D.
REGARDING U.S. PATENT NOS. 9,832,017; 10,237,067; and 10,721,066

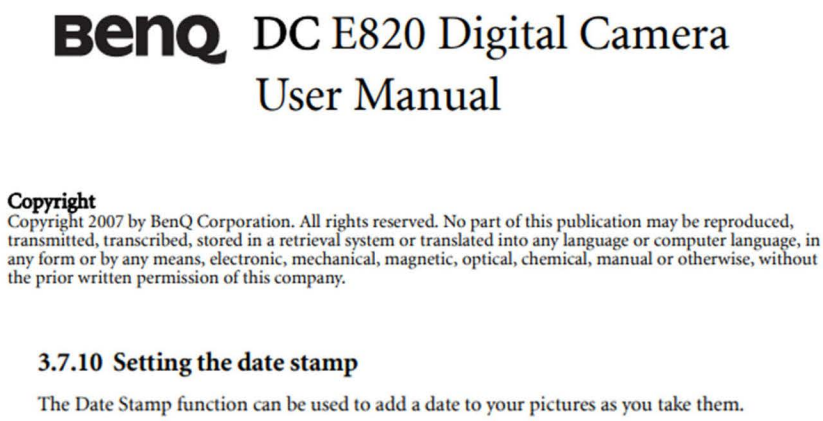




https://www.youtube.com/watch?v=ezME4_xMMnk ("How a film camera superimposes the date on photos") (Last visited October 12, 2023).

610. While the above examples of the Nikon F2 DATA and the Focal P620D are film cameras, digital cameras at the time of the invention were similarly capable of adding a date stamp to captured images, and would have been known to a POSA at the time of the invention.

For example, the BenQ DC E820 digital camera, released in 2007, was capable of adding a date as shown, for example, in Section 3.7.10 on page 16 of the user manual below:



BenQ DC E820 Digital Camera
User Manual

Copyright
Copyright 2007 by BenQ Corporation. All rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual or otherwise, without the prior written permission of this company.

3.7.10 Setting the date stamp

The Date Stamp function can be used to add a date to your pictures as you take them.

https://esupportdownload.benq.com/esupport/Digital%20Camera/UserManual/Digital%20Camera_um_User%20Manual_20070521_113711_DC_E820_UM%20CD%20EN%200515.pdf (Last visited October 12, 2023). In my opinion, the ability of a digital camera to add a date stamp to a captured image is another example of an "internal" image source. Thus, it is my opinion that a POSA at the time of the invention of the Asserted Patents would have known and understood the concept of a camera capturing an image from an "internal" image source.

611. Dr. Bederson further opines that "claims 15-17 are not limited to interfacing the claimed camera with external images sources and thus are not fully described by the patents. Because the full scope of what claims 13 and 15-17 of the patents claim is not described by the written description of the patents, these claims are invalid for lack of written description." (Bederson Report at Para 1850.) For the reasons explained above, I disagree with Dr. Bederson.

612. As explained above, based on the teachings of the specification that the "data capture device" (e.g., camera) is not limited to capturing information from an "external" source, coupled with the knowledge of a POSA regarding cameras capable of capturing images from "internal" image sources existed at the time of the invention, a POSA at the time of the invention

would have understood based on the disclosure of the Asserted Patents that the claimed camera was not limited to capturing images from "external" image sources.

613. Thus, it is my opinion that Claims 13 and 15-17 of the Asserted Patents are supported by sufficient written description and are not invalid.

XLIII. SUBJECT MATTER ELIGIBILITY

614. I have reviewed Dr. Bederson's expert report regarding his opinion that the claims are directed to patent-ineligible subject matter. For the reasons discussed in more detail below, I disagree with his opinions.

615. In paragraphs 1702-1707, Dr. Bederson discusses statements made by MyPort in a Response to IPR proceedings. I disagree with many of his statements therein. I address certain ones here.

616. In paragraph 1703, Dr. Bederson asserts that MyPort described the problem to be solved by the Asserted Patents as simply a problem with organizing and categorizing data including video and images, and then cites to a statement made by Mr. Malone in deposition. I disagree with Dr. Bederson's over-generalization because, among other things, this characterization ignores the technological improvement actually recited by the Asserted Patents as described below.

617. To solve the technological problem specific to computers, and more specifically, to digital media devices, the Asserted Patents are directed to "a system for capturing, storing, indexing and retrieving data objects, which can include a capture device, a storage facility and an access point." ('017 patent at 8:61-64.) The claim elements described in the preceding sentence show that the Asserted Claims are directed to improving the usability and functionality of a capture device, and more importantly, constitute a technology-based solution improving the operation of mobile devices and therefore are not directed to an abstract idea.

618. In paragraph 1707, Dr. Bederson asserts, "[t]hat MyPort says that the second or 'media data converter' is the disclosed 'tag generator' which includes performing 'the tag generation' using 'a human operator.'" I disagree with the assertion that the media/second data converter in the Asserted Claims is operated by a human for the reasons I provided earlier in Section XI.B.2.

619. In paragraph 1709, Dr. Bederson opines that "most of the claims are directed to collecting data, recognizing data, and storing data" and the some are "directed to transmitting that data and storing it in a remote location." In doing so, I believe Dr. Bederson is overly generalizing the claims to fit an abstraction. Specifically, at least, Dr. Bederson ignores that image recognition or tag generation (as he discusses at paragraphs 1712-1713) would be "nearly impossible" to perform as a human given the sheer volume of data.

620. In paragraphs 1712-1717, Dr. Bederson describes different claims, but each discussion rests on the premise that the claims are directed to an abstract idea. He does not consider that the claims are directed to a technological improvement of a computing device.

621. In paragraphs 1718-1721, Dr. Bederson addresses, at least topically, MyPort's position regarding the claims as not being directed to an abstract idea. He acknowledges that the specifications discuss technological improvements to computing devices, but he asserts that the claims do not actually claim those improvement. I disagree, for the reasons stated above and below.

622. In paragraphs 1722-1836, Dr. Bederson provides his opinion on step two of the patentable subject matter analysis and concludes that the Asserted Claims lack an inventive concept and are routine, well-understood, and conventional. I disagree.

623. The Asserted Patents are inventive because of how the claimed combination of elements work together to solve the problem in at least the way that digital audio and image/video files are transmitted, indexed, stored, and retrieved while using less storage space (*see*, paragraph 591 above) to address problems in the existing technologies. For example, the specification describes the problem with the "ability to virtually unlimited number of media files," including the "impossibility to manually describe and index every media file in one's possession" and that as a result, many are not organized, or poorly done so on devices. ('017 patent at 2:21-38.)

624. In paragraphs 1722-1744, Dr. Bederson addresses the technological issues identified by the Asserted Patents and the improvement in computer functionality the Asserted Patents achieve for those problems. Dr. Bederson disagrees with MyPort's positions (as reflected in interrogatory responses quoted by Dr. Bederson). I disagree with Dr. Bederson for the reasons stated above and below.

625. In paragraphs 1722, Dr. Bederson asserts, "… the claims are not even limited to a system in which the tagging of images was done automatically, '017 Patent, 5:51-58, and it could be done by a 'human operator' as indicated by MyPort's correlation of the 'media data converter' and 'second data converter' to the disclosed 'tag generator.'" I disagree for the reasons I provided earlier in Section XI.B.2.

626. Next, in paragraphs 1745-1747, Dr. Bederson presents a discussion and a chart that purports to go limitation by limitation to describe what he alleges are all "conventional" or generic structures. I disagree that at least the first data converter, combiner, and media/second data converter are generic structures or otherwise well understood, conventional, or routine. I also note that in overly simplifying the claims down to three or four words for each limitation,

Dr. Bederson appears to be ignoring the remainder of the claim limitation's language that describes what is being done.

627. In paragraphs 1759-1762, Dr. Bederson provides a discussion of the first data converter. Specifically, while pointing to a first data convertor discussion in the specification, he ignores that the first data convertor can process the data in accordance with the remaining limitations of the claims. For example, the first data converter captures the external audio information and processes and stores the captured external audio information in a digital audio format for the combiner to generate an association and for the media/second data converter to convert to a text context tag. Thus, I disagree with Dr. Bederson that the claimed first data converter is well understood, conventional, or routine.

628. Furthermore, Dr. Bederson appears to ignore that a POSA would understand the first data converter is a secondary data converter, which the Asserted Patents explain is "capable of capturing some phenomenon into a secondary data set, related to but separate from the information captured by the primary data converter." ('017 patent at 9:4-7.) The Asserted Patents further explain, "… at the time of information capture, the capture device may gather additional information from the operator by means of a secondary data converter 108 that relates to defining the context of the data element." ('017 patent at 4:24-27.) For the discussion of why a POSA would understand the first data converter is a secondary data converter, I refer to Section XI.A.2.c. Thus, I disagree with Dr. Bederson that the first data converter of the Asserted Claims is generic in that it is used in a well understood, conventional, or routine manner.

629. It is important to repeat that the audio information that the first data converter (i.e., a secondary data converter) captures is relevant throughout the remainder of the Asserted Claims. The first data converter stores the same audio information as digital audio in internal

storage. The combiner generates an association between the stored digital audio with the stored digital image. The media/second data converter, using the stored digital audio, performs conversion to a text context tag. The internal storage stores the text context tag, which is converted from the stored digital audio, associated with the digital image.

630. In paragraphs 1791-1803, Dr. Bederson provides a discussion regarding the combiner. He points to certain disclosures from Walker, Rothschild, Inoue, Fong, and Fuller references, each for incremental descriptions of what he alleges the combiner does in a "well understood, conventional, or routine" way. I disagree. Dr. Bederson does not provide any reference that, alone, describes a combiner that generates an association between the stored digital audio (captured by the first data converter) and the stored digital image (captured by the camera), where the digital audio is the same audio that the media/second data converter uses for the conversion to a text context tag. For additional discussion, I refer to Sections XI.A.2.c and XI.B.1.

631. In paragraphs 1804-1832, Dr. Bederson provides a discussion regarding the media/second data converter limitations. He points to numerous references in an effort to describe the media/second data converter claimed by the patents. However, Dr. Bederson ignores that the received set of captured information the media/second data converter converts is the information captured by the camera (i.e., a primary data converter) and the first data converter (i.e., a secondary data converter) and stored as the digital image and audio, respectively, where the combiner generates an association between the digital image and audio. For example, the media/second data converter must "know," from the received set of captured information, what the stored digital audio captured by the first data converter (i.e., a secondary data converter) is to convert it to a text based searchable file as a text context tag. Also, Dr. Bederson argues that the

media/second data converter in the Asserted Claims, "can be a 'tag generator in which the tag generation is performed by a human operator,'" (¶¶ 1804) and "… merely seeks to automate a process that was conventionally performed by users manually or by automatically determining the content of images and audio using image recognition and speech-to-text conversion," citing a malformed sentence in the specification of the '017 patent. (¶¶ 1834). I disagree for the reasons I provided earlier in Section XI.B.2. Dr. Bederson does not provide any reference that, alone, describes the media/second data converter as discussed above.

632. Further, while Dr. Bederson discusses each limitation individually, opining that each is allegedly well-understood, routine, or conventional, he fails to analyze whether the ordered combination of the limitations may nonetheless be patent-eligible under step two.

633. Regarding Dr. Bederson's opinions on invalidity, there is not a single opinion that a single reference discloses the first data converter, the combiner, and the media/second data converter. Instead, Dr. Bederson relies on combinations of prior art to form his opinion. But it is the combination of these limitations that clearly show that the claims are directed to patent-eligible subject matter. The improvement and incorporation of computer hardware, a capture device to capture image and audio information using primary and secondary data converters, create associations, convert/creating context tags, and store that information in association, in its ordered combinations, are not well known, understood, or conventional but rather substantially more so, and inventive.

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RESTRICTED – ATTORNEYS' EYES ONLY

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Signed this 13th day of October, 2023 in Los Angeles, CA.

Jae Young Bang, Ph.D.